

Compuprint 4247 Serial Matrix Printers

Compuprint 4247 Model X03/Z03 Printers: Programmer Manual

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Before using this information and the product it supports, read the information in “Notices” on page 357.

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This edition applies to the Compuprint 4247 X03-Z03 printers and to all subsequent releases and modifications until otherwise indicated in new edition.

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The 4247 Model X03/Z03 Serial Matrix Printers

The 4247 Model X03/Z03 printers are professional, industrial impact-matrix printers. The 4247 Model X03/Z03 printers are rugged printers designed for harsh environments and demanding applications. Each of the 4247 models offers user-installable interface cards.

The 4247 Model X03/Z03 printers can have either one or two straight continuous-forms paper paths. One paper path is standard, and the second path is an optional feature. The printer operator panel is common with these models and includes the same full-function, full-size, 2 line by 24 character display, making messages and menus easy to understand.

Print-quality choices are Fast Draft mode (Model Z03 only), Data Processing mode (DP), DP Text mode (DP Text), and Near Letter Quality mode (NLQ). Versatile paper-handling capability provides printing on up to 8-part forms. Typical applications include transaction processing for invoices, office or internal business documents, as well as barcodes, labels, and multipart forms.

Printer description

The 4247 Model X03/Z03 printers build on the strengths of previous models of the 4247 family while providing a Fast Draft mode for the Model Z03 and a faster print speed for the Model X03.

Print speeds

The 4247 Model X03/Z03 printers print speeds (in characters per second):

Print Quality	4247 X03	4247 Z03
Fast Draft	N/A	1100
Data Processing (DP)	800	800
DP Text	400	480
Near Letter Quality	200	240
Note: Print speed (CPS) at 10 CPI.		

Paper paths

The 4247 Model X03/Z03 printers provide exceptional forms-handling flexibility. The base printer includes one front continuous-forms tractor paper path, and an optional second continuous-forms tractor paper path. Both continuous-form paper paths are front loading. Paper path linking is available when the optional second tractor is installed.

Paper path nomenclature

Front continuous-forms tractor. The first tractor visible when opening the front tractor cover is called the front continuous-forms tractor. In the standard (one tractor) configuration the installed tractor is called the front continuous-forms tractor.

In the optional (two tractor) configuration the forward most installed tractor is called the front continuous-forms tractor.

Rear continuous-forms tractor. In the optional (two tractor) configuration the tractor behind the front continuous-form tractor is called the rear continuous-forms tractor.

Print qualities

Fast Draft is a print quality available only for the 4247 Model Z03 printer. The Data Processing (DP), Data Processing Text (DP Text), Near Letter Quality (NLQ), OCR-A, and OCR-B print qualities on the 4247 Model X03 printer is equivalent in character size, shape, and resolution to the print qualities available on the 4247 Models Z03 printer.

Print quality selection

Print quality can be selected using program control or through the printer operator panel. Program control datastream commands take precedence over operator panel settings and can not be overridden.

Available printer operator panel settings are:

Print Quality = Fast Draft (Model Z03 printer)

Fast Draft is the default setting for the Model Z03 printer.

Print Quality = DP

DP is the default setting for the Model X03 printer.

Print Quality = DP TEXT

Print Quality = NLQ

Print Quality = OCR-A

Print Quality = OCR-B

An 4247 Model Z03 printer operator panel feature, **Host Fast Draft**, is a setting that allows application programs written for earlier printers in **DP** mode to print in **Fast Draft** mode without changes to the application program. If **Host Fast Draft** is enabled then **DP** mode applications print in **Fast Draft** mode. If **Host Fast Draft** is disabled then **DP** mode applications print in **DP** mode.

The following table summarizes the print quality for **Fast Draft** (model Z03 only), **DP**, **DP Text**, and **NLQ**:

Print quality	Horizontal DPI	Vertical DPI	Horizontal character cell size (dots)	Vertical character cell size (dots)
Fast Draft (Model Z03 only)	45	72	9	9
DP	60	72	12	9
DP Text	100	72	20	9
NLQ	100	144	20	18

Printer interfaces

There are three Controller Board options:

- Allows a host connection to Parallel, Serial, and USB 2.0 interfaces
- Allows a host connection to Parallel and ASCII Ethernet 10/100 BaseT LAN Network interfaces.
- Allows a host connection to Parallel and ASCII-IPDS Ethernet 10/100 BaseT LAN Network interfaces.

Printer datastream emulations

- ASCII emulations for the IBM® 4202 Proprinter III XL, IBM 2381 Personal Printer, and Epson FX printers
- IPDS™ emulations for the IBM 4224 and IBM 4230 printers
- IBM 4247 mode (native mode) extensions to ASCII and IPDS datastream emulations

How to Use This Manual

The following lists describes the contents of each chapter and the appendixes:

Chapter 1, “Personal Printer Data Stream (PPDS),” on page 1 describes the Personal Printer Data Stream (PPDS) programming commands for use when your printer is attached and emulation mode is set to 4247, 4202 III XL, or 2381 Personal Printer.

Chapter 2, “Epson FX-1050 Data Stream,” on page 39 describes Epson FX printers Data Stream commands for use when your printer is attached and emulation mode is set to Epson FX.

Chapter 3, “Intelligent Printer Data Stream,” on page 75 explains the concepts and basic principles of the Intelligent Printer Data Stream™ (IPDS).

Chapter 4, “IPDS Programming Information,” on page 99 contains the technical details of IPDS commands that the 4247 receives and sends.

Chapter 5, “IPDS Exception Reporting Codes,” on page 199 contains the exception reporting codes the printer sends to the host in the NACK reply.

Chapter 6, “Print Samples and IPDS Coding Example,” on page 215 contains samples showing the printing capabilities of the 4247 Printer.

Appendix A, “Code Pages,” on page 231 contains the code pages (both EBCDIC and ASCII) available on this printer.

Appendix B, “Application Paper Source Selection,” on page 321 describes the differences between the 4247 Printer and other IBM compatible printers.

Appendix C, “4247 Bar Code and OCR Printing Options,” on page 323 describes the bar codes available for the printer and describes the Optical Character Recognition (OCR) printing options.

Appendix D, “Configuration Menu Lockout,” on page 327 describes the Menu Lock function of the operator panel.

Chapter 1. Personal Printer Data Stream (PPDS)

The 4247 Model X03/Z03 printers implement a subset of PPDS. The environment in which the printer data stream processor operates is described below.

Print Job Processing

There are no PPDS controls that explicitly define print job boundaries. A print job for the 4247 is established by the host system and consists of any set of related print objects. A print job could be as short as one character or could be many pages long.

As an aid to the printer operator, the printer provides a **PROCESSING** indicator on the operator panel. When the **PROCESSING** indicator is flashing, it indicates that data is currently being received, processed, or printing, or that data is buffered in the printer but cannot be immediately printed. If the **PROCESSING** indicator is not lit, then all print jobs have been completed.

Configuration parameter values can be changed at any time; however, to obtain predictable results, changes to operator panel configuration parameter values should be made *before* the print job is sent to the printer and *after* the previous print job has completed printing. Changing configuration parameter values while a print job is in progress may cause unpredictable results.

We recommend the following to ensure that your print jobs run correctly:

- Establish a known print environment, and end any previous print job. Start each print job with a Set Initial Conditions control. This control resets the printer environment to the default settings. You can then set additional controls depending on your print job environment.
- End each print job with a **FORM FEED** control. This control causes all data to be printed, and the current position is set to the top-of-form position.
- If a print job is abnormally terminated, the job should be canceled. See “Cancel Print” in “Chapter 2. Understanding the Operator Panel” in the *User's Guide* for your printer.

Page Printing Concept

The 4247 processes print jobs in terms of pages, as well as in lines and columns. A page is a logical entity whose boundaries are defined by the width and the page length. These boundaries are established during printer initialization using the printer defaults, and can be changed using the Configuration Menu or by issuing the appropriate data stream controls.

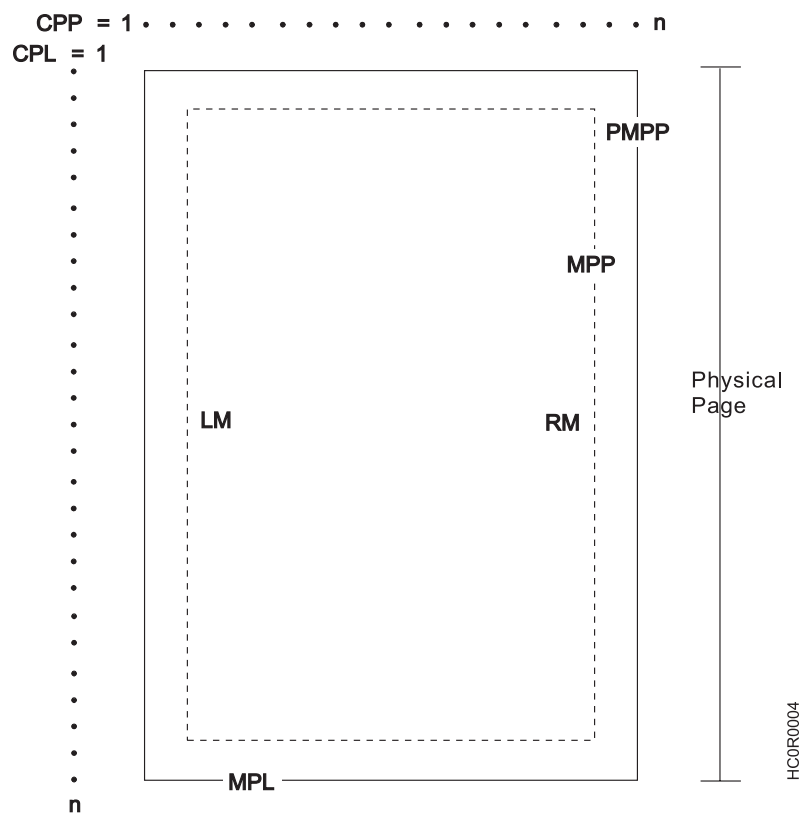
As a job prints, the printer controller maintains both the logical position and the physical position on the page. If a print job does not end with a proper job terminator (for example, **FORM FEED**), then:

- All data for the current page may not print
- The next print job may be misaligned on the form
- Residual data from a previous job could print with the new job.

Page Presentation

Many PPDS commands (tabs, margins, line spacing, for example) are described in terms of the presentation surface. A presentation surface is a two-dimensional surface upon which the printer positions symbols according to controls embedded in the incoming data stream. The presentation surface is defined in absolute terms by the width and depth parameters of the page size control commands (Set Page Length, Set Horizontal Margins, for example). The physical print position does not move outside the range of these two parameters. The left margin (LM) and right margin (RM) are variable parameters within the presentation surface. The logical print position does not move outside the range of the vertical margins nor outside the horizontal margins + 1. The following figure shows the presentation surface and the

relationships of some of these parameters.



CPP

CPP Current Print Position ($LM \leq CPP \leq RM$).

CPL Current Print Line

MPP Maximum Print Position (in characters at current CPI)

PMPP Physical Maximum Print Position. The largest number of characters that can be placed on one line of the surface (the largest value that MPP can assume).

LM Left Margin

RM Right Margin

MPL Maximum Page Length (in lines at current LPI)

Notes:

1. The host should set the limits of the presentation surface if the default or previous values are not acceptable.
2. The operator should align the physical paper so that it matches the logical presentation surface.

Also created with this surface is a pair of numbers (CPL and CPP) which specify the line number and column number where the next graphic will be printed. These internal values are the logical position on the presentation surface.

The variable parameters have default values which are established when the printer is initialized. The standard power-on defaults are:

MPP (width)	Operator panel setting
MPL (depth)	Operator panel setting
CPI	Operator panel setting
LPI	Operator panel setting
LM	0 inches (Column 1)

RM	Equal to MPP
HT	Horizontal tabs are set at each 8th column, starting with column 9 (9, 17, 25, 33, and so on.)
VT	Vertical tabs are all cleared

Graphic and Control Character Sequences

PPDS uses an ASCII encoding scheme to define controls and printable graphics. Multiple code pages for printable graphics are supported. Control characters are interpreted based on the environment established by any preceding control characters and signals.

The 4247 supports several ASCII code pages. Within a code page, a code point can be treated as a printable character (including space) or as a control code. The following data stream controls affect how a code point is interpreted:

ESC 6 Select PC Character Set 2

ESC 7 Select PC Character Set 1

**ESC ** Print All Characters

ESC ^ Print Single Character

ESC [K
Set Initial Conditions

The following code points are interpreted as control characters:

- PC Character Set 1
 - X'00' to X'1F'
 - X'7F' (treated as NULL)
 - X'80" to X'9F'
- PC Character Set 2
 - X'00' to X'02'
 - X'07' to X'1F'
 - X'7F' (treated as NULL)

Note: No characters are treated as controls when they are part of a Print Single Character or Print All Characters control.

The following code points are interpreted as printable graphic characters:

- PC Character Set 1
 - X'20' (space)
 - X'21' to X'7E'
 - X'A0" to X'FE'
 - X'FF' (required space)
- PC Character Set 2
 - X'03' to X'06'
 - X'20' (space)
 - X'20' to X'7E'
 - X'80' to X'FE'
 - X'FF' (required space)

Note: All characters are treated as printable graphic characters when they are part of a Print Single Character or Print All Characters control.

PPDS Compatibility

PPDS is supported in 4247, 2381 Personal Printer, and 4202 Proprinter III XL emulation modes. When 4247 is selected, PPDS control codes are supported in the same manner as if emulating the 2381 Personal Printer. The Emulation Mode can be selected from the Configuration Menu using the operator panel. Emulation mode may also be selected using the Set Initial Conditions (ESC [K) control sequence, if the printer is set to 4247 or 2381 Personal Printer emulation mode.

One-Byte Controls

The printer uses the following one-byte controls:

Control	Hex	Name
NUL	00 (80)	Null (no operation)
BEL	07 (87)	Bell
BS	08 (88)	Backspace
HT	09 (89)	Horizontal Tab
LF	0A (8A)	Line Feed
VT	0B (8B)	Vertical Tab
FF	0C (8C)	Form Feed
CR	0D (8D)	Carriage Return
SO	0E (8E)	Shift Out (Double-Wide Print)
SI	0F (8F)	Shift In (Condensed Print)
DC1	11 (91)	Device Control 1 (Select)
DC2	12 (92)	Device Control 2 (Select 10 CPI)
DC3	13 (93)	Device Control 3 (Deselect)
DC4	14 (94)	Device Control 4 (Cancel Double-Wide Print)
CAN	18 (98)	Cancel
ESC	1B (99)	Escape (Multiple-byte control prefix)
SP	20	Space

Note: Control hex values within parentheses (nn) are recognized only within PC Character Set 1.

Null (NUL)

00

This control terminates the Set Horizontal Tab and Set Vertical Tab control codes. The printer ignores NUL by itself.

Bell (BEL)

07

This control causes the audible alarm to sound, if enabled. The alarm may be disabled or enabled from the Configuration Menu.

Backspace (BS)

08

This control moves the print position horizontally one character width to the left. If the current print position is at the left margin, the printer ignores this command.

Horizontal Tab (HT)

09

This control moves the print position to the next horizontal tab stop. If there are no tab stops to the right, or if the next tab stop is beyond the current right margin, the control is ignored.

Line Feed (LF)

0A

This control advances the paper one line. The horizontal position does not change unless automatic carriage return mode is activated from the operator panel Configuration Menu. If the paper advance crosses the bottom margin, the printer completes all deferred printing on the current page and then does an automatic form feed.

If skip perforation mode is active and the bottom margin is crossed, the vertical position on the new page following the automatic form feed will be the top-of-form position. If skip perforation is not active, the vertical position on the new page is the point immediately following the previous print line.

Vertical Tab (VT)

0B

This control causes the vertical print position to be advanced to the next vertical tab stop. The horizontal position is not affected unless automatic carriage return mode is activated from the operator panel Configuration Menu. If there are no tab stops past the current vertical print position, Vertical Tab is treated as a Line Feed.

Form Feed (FF)

0C

This control causes a new page to be started. Form Feed is a line end and page end control; it causes all deferred printing that may have been buffered for the current page to be completed and the form physically advanced to eject the current page. The vertical print position advances to the top margin and the horizontal print position is set to the left margin for subsequent printing.

Carriage Return (CR)

0D

This control moves the current horizontal print position to the left margin. The vertical print position does not change unless automatic line feed mode is active (see “Set Auto Line Feed (ESC 5)” on page 13).

Shift Out (SO) / Double-Wide Print

0E

This control causes the printer to start double-width printing. Double-width printing prints the characters twice as wide as the current character spacing. This results in half as many characters per inch. Each character takes up the space of two single-width characters. A Carriage Return, Line Feed, Form Feed, Vertical Tab, Double-Wide Continuous Mode, or Cancel Double-Wide Print with vertical movement specified cancels the Shift Out control code.

Shift In (SI) / Condensed Print

0F

This control prints graphic characters in condensed pitch (15 CPI, 16.7 CPI, 17.1 CPI or 20 CPI).

Shift In is a buffer terminating control; if printable data at a different character-per-inch setting is buffered, that data is printed before the setting is changed. The current print position becomes the next printable column at the new character-per-inch setting. CPI can be changed within a print line, and this control changes the maximum number of characters that can be printed on one line.

When Printer Compatibility 7 – Condensed Print option in the ASCII Configuration menu is set to 15 CPI, then 15 CPI is selected, otherwise, 16.7 CPI or 17.1 CPI is selected.

A combination of 12 CPI and Condensed Print sets the printer to 20 CPI when Printer Compatibility 9 (20 CPI) option is set to Enabled in the ASCII Configuration menu. A combination of 12 CPI and Condensed Print sets the printer to 12 CPI when Printer Compatibility 9 (20 CPI) option is set to Disabled in the ASCII Configuration menu.

Device Control 1 (DC1) / Select

11

This control selects the printer.

Device Control 2 (DC2) / Select

12

This control sets 10 characters per inch. DC2 is a buffer terminating control; if printable data at a different characters-per-inch setting is buffered, that data is printed before the setting is changed. The current print position becomes the next printable column at the new character-per-inch setting. CPI can be changed within a print line.

Device Control 3 (DC3) / Select

13

This control is treated as a NUL.

Device Control 4 (DC4) / Select

14

This control cancels double-wide printing if double wide was selected with the Shift Out control. The characters-per-inch setting returns to the previous value.

Cancel (CAN)

18

This control purges all buffered data. All data received after the most recent buffer terminating control is discarded. For a list of buffer terminating controls, see “Buffer Terminating Conditions” on page 38. Any data received after Cancel is processed normally. Cancel does not change the current print position.

Escape (ESC)

1B

This control is a prefix used in combination with supplementary control bytes to provide an extended set of control functions.

Space

20

This control moves the print position one character space to the right.

Escape Sequence Controls

Escape sequence controls have an ESC followed by one or more control parameters. Supported escape sequence controls are:

Control	Hex	Name
ESC NUL	1B 00	Null (no operation)
ESC BEL	1B 07	Bell
ESC BS	1B 08	Backspace
ESC HT	1B 09	Horizontal Tab
ESC LF	1B 0A	Line Feed
ESC VT	1B 0B	Vertical Tab
ESC FF	1B 0C	Form Feed
ESC CR	1B 0D	Carriage Return
ESC SO	1B 0E	Shift Out (Double-Wide Print)
ESC SI	1B 0F	Shift In (Condensed Printer)
ESC DC1	1B 11	Device Control 1 (Select)
ESC DC2	1B 12	Device Control 2 (Select 10 CPI)

Control	Hex	Name
ESC DC3	1B 13	Device Control 3 (Deselect)
ESC DC4	1B 14	Device Control 4 (Cancel Double-Wide Print)
ESC CAN	1B 18	Cancel
ESC EM	1B 19	Turn Auto Sheet Feeder On or Off
ESC -	1B 2D	Auto Underscore
ESC 0	1B 30	Set 1/8 Inch Line Spacing
ESC 1	1B 31	Set 7/72 Inch Vertical Spacing
ESC 2	1B 32	Invoke Text Line Spacing
ESC 3	1B 33	Set Graphics Line Spacing
ESC 4	1B 34	Set Top of Form
ESC 5	1B 35	Set Auto Line Feed
ESC 6	1B 36	Select PC Character Set 2
ESC 7	1B 37	Select PC Character Set 1
ESC :	1B 3A	Set 12 CPI
ESC <	1B 3C	Unidirectional Printing
ESC =	1B 3D	Character Font Image Download
ESC A	1B 41	Select n/72 Inch Spacing
ESC B	1B 42	Set Vertical Tabs
ESC C	1B 43	Set Page Length (Lines or Inches)
ESC D	1B 44	Set Horizontal Tabs
ESC E	1B 45	Begin Emphasized Print
ESC F	1B 46	End Emphasized Print
ESC G	1B 47	Begin Double-Strike Print
ESC H	1B 48	End Double-Strike Print
ESC I	1B 49	Change Font
ESC J	1B 4A	Relative Move Baseline
ESC K	1B 4B	Normal Density Bit Image Graphics
ESC L	1B 4C	Dual Density Bit Image Graphics, Type 1
ESC N	1B 4E	Begin Skip Perforation
ESC O	1B 4F	End Skip Perforation
ESC P	1B 50	Proportional Space Mode
ESC Q	1B 51	Deselect on Positive Query Reply
ESC R	1B 52	Set Default Tabs
ESC S	1B 53	Begin Subscript/Superscript
ESC T	1B 54	End Subscript/Superscript
ESC U	1B 55	Set Print Direction
ESC W	1B 57	Double-Wide Continuous Mode
ESC X	1B 58	Set Horizontal Margins
ESC Y	1B 59	Dual Density Bit Image Graphics Type 2
ESC Z	1B 5A	Dual Density Bit Image Graphics
ESC \	1B 5C	Print All Characters

Control	Hex	Name
ESC]	1B 5D	Reverse Line Feed
ESC ^	1B 5E	Print Single Characters
ESC _	1B 5F	Continuous Overscore
ESC d	1B 64	Relative Move Right
ESC e	1B 65	Relative Move Left
ESC [- (See Note)	1B 5B 2D	Select Line Scoring
ESC [@	1B 5B 40	Set Presentation Highlights (SPH)
ESC [I (See Note)	1B 5B 49	Set Font Global (SFG)
ESC [K	1B 5B 4B	Set Initial Conditions (SIC)
ESC [T (See Note)	1B 5B 54	Select Code Page (SCP)
ESC [d (See Note)	1B 5B 64	Set Print Quality (SPQ)

Note: Commands are only available in 4247 or 2381 emulation mode.

Null (ESC NUL)

1B	00
----	----

The printer ignores the NUL control by itself.

Bell (ESC BEL)

1B	07
----	----

This control causes the audible alarm to sound, if enabled. The alarm may be disabled or enabled from the Configuration Menu.

Backspace (ESC BS)

1B	08
----	----

This control moves the print position horizontally one character width to the left. If the current print position is at the left margin, the printer ignores this command.

Horizontal Tab (ESC HT)

1B	09
----	----

This control moves the print position to the next horizontal tab stop. If there are no tab stops to the right, or if the next tab stop is beyond the current right margin, the control is ignored.

Line Feed (ESC LF)

1B	0A
----	----

This control advances the paper one line. The horizontal position does not change unless automatic carriage return mode is activated from the operator panel Configuration Menu. If the paper advance crosses the bottom margin, the printer completes all deferred printing on the current page and then does an automatic form feed.

If skip perforation mode is active and the bottom margin is crossed, the vertical position on the new page following the automatic form feed will be the top-of-form position. If skip perforation is not active, the vertical position on the new page is the point immediately following the previous print line.

Vertical Tab (ESC VT)

1B	0B
----	----

This control causes the vertical print position to be advanced to the next vertical tab stop. The horizontal position is not affected unless automatic carriage return mode is activated from the operator panel Configuration Menu. If there are no tab stops past the current vertical print position, Vertical Tab is treated as a Line Feed.

Form Feed (ESC FF)

1B	0C
----	----

This control causes a new page to be started. Form Feed is a line end and page end control; it causes all deferred printing that may have been buffered for the current page to be completed and the form physically advanced to eject the current page. The vertical print position advances to the top margin and the horizontal print position is set to the left margin for subsequent printing.

Carriage Return (ESC CR)

1B	0D
----	----

This control moves the current horizontal print position to the left margin. The vertical print position does not change unless automatic line feed mode is active (see “Set Auto Line Feed (ESC 5)” on page 13).

Shift Out (ESC SO) / Double-Wide Print

1B	0E
----	----

This control causes the printer to start double-width printing. Double-width printing prints the characters twice as wide as the current character spacing. This results in half as many characters per inch. Each character takes up the space of two single-width characters. A Carriage Return, Line Feed, Form Feed, Vertical Tab, Double-Wide Continuous Mode, or Cancel Double-Wide Print with vertical movement specified cancels the Shift Out control code.

Shift In (ESC SI) / Condensed Print

1B	0F
----	----

This control prints graphic characters in condensed pitch (15 CPI, 16.7 CPI, 17.1 CPI or 20 CPI).

Shift In is a buffer terminating control; if printable data at a different character-per-inch setting is buffered, that data is printed before the setting is changed. The current print position becomes the next printable column at the new character-per-inch setting. CPI can be changed within a print line, and this control changes the maximum number of characters that can be printed on one line.

When Printer Compatibility 7 – Condensed Print option in the ASCII Configuration Menu is set to 15 CPI, then 15 CPI is selected, otherwise, 16.7 CPI or 17.1 CPI is selected.

A combination of 12 CPI and Condensed Print sets the printer to 20 CPI when Printer Compatibility 9 (20 CPI) option is set to Enabled in the ASCII Configuration menu. A combination of 12 CPI and Condensed Print sets the printer to 12 CPI when Printer Compatibility 9 (20 CPI) option is set to Disabled in the ASCII Configuration menu.

Device Control 1 (ESC DC1 / Select)

1B	11
----	----

This control selects the printer.

Device Control 2 (ESC DC2) / Select 10 CPI

1B	12
----	----

This control sets 10 characters per inch. DC2 is a buffer terminating control; if printable data at a different characters-per-inch setting is buffered, that data is printed before the setting is changed. The current print position becomes the next printable column at the new character-per-inch setting. CPI can be changed within a print line.

Device Control 3 (ESC DC3) / Deselect

1B	13
----	----

This control is treated as a NUL.

Device Control 4 (ESC DC4) / Cancel Double-Wide Print

1B	14
----	----

This control cancels double-wide printing if double wide was selected with the Shift Out control. The characters-per-inch setting returns to the previous value.

Cancel (ESC CAN)

1B	18
----	----

This control purges all data in the preceding print buffer. Any data received after Cancel is processed normally. Cancel does not change the current print position.

Auto Underscore (ESC -)

1B	2D	NN
----	----	----

This control turns on and off the continuous underscore function.

If NN is 1, the printer underscores all text characters and spaces following this sequence. The printer does not underscore white space caused by horizontal tabs.

If NN is 0, the printer stops the underscore of all data following this sequence.

Set 1/8 Inch Line Spacing (ESC 0)

1B	30
----	----

This control sets the line spacing to eight lines per inch.

The application program is responsible for keeping track of the vertical position on the current page relative to the current line spacing. Changing the line spacing within a print job without changing the page length can cause printing on the page perforation. For additional information, see “Set Page Length (ESC C)” on page 15.

Set 7/72 Inch Line Spacing (ESC 1)

1B	31
----	----

This control sets the line spacing to 7/72 inch. The application program is responsible for keeping track of the vertical position on the current page relative to the current line spacing. Changing the line spacing within a print job without changing the page length can cause printing on the page perforation. For additional information, see “Set Page Length (ESC C)” on page 15.

Invoke Text Line Spacing (ESC 2)

1B	32
----	----

This control sets the line spacing at the value set by the last Set Text Line Spacing (ESC A) control received. The printer sets the line spacing to six lines per inch if no ESC A has been issued.

Set Graphics Line Spacing (ESC 3)

1B	33	NN
----	----	----

This control changes the line spacing to the value specified by NN.

NN is a value that specifies the line spacing in units of 1/216 inch. Valid values are 0 to 255. If N equals 0, the printer ignores this control.

The application program is responsible for keeping track of the vertical position on the current page relative to the current line spacing. Changing the line spacing within a print job without changing the page length can cause printing on the page perforation. For additional information, see “Set Page Length (ESC C)” on page 15.

Set Top of Form (ESC 4)

1B	34
----	----

This control establishes the current vertical position as the top of form.

Set Auto Line Feed (ESC 5)

1B	35	NN
----	----	----

This control sets the automatic line feed mode of the printer. When automatic line feed is on, the printer does a line feed each time it receives a carriage return. When automatic line feed is off, a carriage return is processed normally. This control overrides the automatic line feed mode set in the operator panel Configuration Menu.

If NN is 1, the printer turns automatic line feed mode on.

If NN is 0, the printer turns automatic line feed mode off.

Select PC Character Set 2 (ESC 6)

1B	36
----	----

This control selects PC Character Set 2 as the active character set. In PC Character Set 2, code points X'03' to X'06', X'15', and X'80' to X'9F' are treated as graphic characters (not controls). See “Graphic and Control Character Sequences” on page 3.

Select PC Character Set 1 (ESC 7)

1B	37
----	----

This control selects PC Character Set 1. In PC Character Set 1, code points X'03' to X'06', X'15', and X'80' to X'9F' are treated as controls (not printable graphics). See “Graphic and Control Character Sequences” on page 3.

Set 12 CPI (ESC :))

1B	3A
----	----

This control sets the pitch to 12 characters per inch. If the current font is proportionally spaced, this control selects a horizontal resolution of 240 dots per inch. If the active font is OCR, the printer does not prohibit the change in pitch; however, the printed OCR characters may be unreadable by automatic identification equipment.

Unidirectional Printing (ESC <)

1B	3C
----	----

This command selects unidirectional printing for one line only. The print head moves to the home position at the left side of the printer and prints one line, left to right. The command is then cancelled by the carriage return that sends the print head back to the home position.

Character Font Image Download (ESC =)

1B	3D	LL	HH	FF	LF	W	H	CP	N	XX...XX
----	----	----	----	----	----	---	---	----	---	---------

This control downloads special character images.

A two-byte count (LL HH) indicates the number of bytes that follow in this control.

LL is the least significant byte of the count; HH is the most significant byte of the count. The number of bytes that follow should equal $HH \times 256 + LL$. If the count equals X'0000', the control is ignored.

FF is the format byte and must equal X'13'. LF is a one-byte font identifier that specifies the previously initialized or selected font to be modified. See "Change Font (ESC I)" on page 16.

W is a one-byte value that specifies the width of the character cells in options. For DP fonts, the value is X'0A'. For fixed pitch DP Text and NLQ fonts, the value is X'14'. For DP Text and NLQ, proportional fonts values may vary. However, for all code points downloaded with this control, all character cells defined will be Width options wide.

H is a one-byte value that specifies the height of the character cells in dots. Valid values are X'09' for DP and DP Text and X'12' for NLQ.

CP is a one-byte value. This parameter specifies the first code point to download. A single code point or multiple code points can be downloaded. If the font being downloaded was previously initialized, the downloaded characters overlay the resident characters in the font.

N is a one-byte value that specifies the number of code points defined by this control. If the starting code point plus the number of code points is greater than 256, the control is ignored.

XX .. XX is the font image download data. These data bytes define the character cells. Multiple bytes define each vertical slice of the character cell. The slice data for each code point is in a contiguous format (run-together) as follows:

- If the slice data is nine-bits high, byte 1 is put into the high-order bits in slice 1 and the high-order bit of byte 2 is the low order bit of slice 1. The remaining seven bits of byte 2 are put into the high-order seven bits of slice 2, and so on.
- If the slice data is 18-bits high, bytes 1 and 2 are put into the high-order bits of the first slice and the two high-order bits of byte 3 complete the first slice. Slice 2 is composed similarly, starting with the remaining six bits in byte 3.

Note: The contiguous format (run-together) does not occur from one code point to the next. The top dot of the leftmost slice of each code point is always in the high-order bit of the first byte of image data for that code point.

The number of data bytes required to define the image for each code point can be calculated as follows:

$$\text{Image Length} = (\text{Width} \times \text{Height}) \div 8$$

Note: If there is a remainder from the division by 8, add 1 to the quotient.

Example: To define an image for a standard DP font where Width = 10 and Height = 9:

$$\text{Image Length} = (10 \times 9) \div 8$$

Image Length = 11 with a remainder of 2

Image Length = 12 bytes per character

If both printer provided images and downloaded images are to be printed from the same local font ID, we recommend that the downloaded images be sent, using this control, at the start of a print job when the print environment for the job is established. This ensures that the actual printed output appears as intended.

It is also recommended that image data bits for the last vertical column of NLQ character patterns be all zeros. The last vertical column will be clipped if NLQ character patterns are expanded for graphics printing. Resident NLQ text character patterns do not contain image data (dots) in the last column of the character box.

Select n/72 Inch Line Spacing (ESC A)

1B	41	NN
----	----	----

This control stores the line spacing value, in units of 1/72 inch, which is later selected by Invoke Text Line Spacing (ESC 2). The valid values for NN are X'01' to X'FF' (1 to 255). The default line spacing is X'0C' (six lines per inch).

A value of 0 is not valid and causes the printer to ignore this command. Following are example values for NN:

X'00'	No Change
X'18'	3 LPI
X'12'	4 LPI
X'0C'	6 LPI
X'09'	8 LPI
X'08'	9 LPI
X'06'	12 LPI

Set Vertical Tabs (ESC B)

1B	42	TT...TT	00
----	----	---------	----

This control sets the vertical tab stops. The maximum number of tab stops supported is 64. The Null control code terminates this sequence. If the Null terminator is missing, the printer treats the next 64 bytes as tab stops and ignores all the data bytes following these 64 bytes until a Null is received. If the printer receives this sequence without any tabs specified, all tab stops are cleared.

TT...TT are the tab values that specify the tab stops as line numbers, relative to the top of the physical page. Tab stops must be specified in ascending order; entries not in ascending order are ignored.

Set Page Length (ESC C)

1B	43	LL	IN
----	----	----	----

This control sets the physical page length in lines or inches and resets skip perforation mode.

LL is a one-byte hexadecimal number that specifies the page length in lines. The value is converted to inches based upon the current line spacing. Valid values for LL are X'01' to X'FF', but the resulting page length in inches must be less than 113.8 inches (2890 mm). If LL equals 0, then parameter II (length in inches) is used.

IN is a one-byte hexadecimal number that specifies the page length in inches. IN is present only if parameter LL equals 0. Valid values for IN are X'01' to X'71'. If IN is greater than the maximum value, the maximum value is used. If both LL and IN are zero, the control is ignored.

Set Horizontal Tabs (ESC D)

1B	44	TT...TT	00
----	----	---------	----

This control sets the horizontal tab stops. The maximum number of tab stops supported is 28. The sequence terminates with the NUL control code. If the null terminator is missing, the printer treats the next 28 bytes as tab stops and ignores all the data bytes following the 28 bytes until a Null is received. If the printer receives this control code with no tabs, all horizontal tab stops are cleared.

TT is the list of tab stops as character positions relative to the left edge of the physical page. Valid values are X'01' to X'FF'. Tab stops must be specified in ascending order. Entries not in ascending order are ignored.

Begin Emphasized Print (ESC E)

1B	45
----	----

This control starts emphasized print mode (bold style). Emphasized printing continues until the printer receives an End Emphasized Print (ESC F) control or the printer is initialized.

End Emphasized Print (ESC F)

1B	46
----	----

This control ends emphasized print mode (bold style).

Begin Double-Strike Print (ESC G)

1B	47
----	----

This control starts double-strike printing (all text characters are double struck). Double-strike printing continues until the printer receives an End Double-Strike Print control (ESC H) or the printer is initialized.

End Double-Strike Print (ESC H)

1B	48
----	----

This control ends double-strike printing.

Change Font (ESC I)

1B	49	NN
----	----	----

This control selects the font to be used for printing.

NN is the one-byte local font identifier number that specifies the font. The mapping of the local font identifier is dependent upon the printer's emulation mode setting. In the Configuration Menu, if the emulation mode is set to 4202 III XL, the Change Font control code selects fonts compatible with the 4202 Proprinter III XL Printer. If the emulation mode is set to 4247 or 2381, Change Font selects the fonts compatible with the 2381 Personal Printer.

Supported local font identifiers are shown in the following table.

Local Font Identifier (Hex)	4247 and 2381 Emulation Mode	4202 III XL Emulation Mode
00	Default (op. panel selection)	DP
01	DP	Fast Draft (for model Z03); DP (for model X03) (See Note 1)
02	DP Text	DP Text
03	NLQ (Courier/Gothic)	NLQ (Courier/Gothic)
04	DP Text Proportional	DP (Download)
05	NLQ Proportional (Courier/Gothic)	DP (Download)
06	Fast Draft (for model Z03); DP (for model X03)	DP text (Download)
07	Reserved	NLQ (Download)
08-0F	Reserved	Reserved
10	OCR-A	Reserved
11	OCR-B	Reserved
12-5F	Reserved	Reserved
60	Reserved	Default (op. panel selection)
61	Reserved	Fast Draft (for model Z03); DP-Gothic (for model X03) (See Note 1)
62	Reserved	NLQ Proportional (Courier/Gothic)
63	Reserved	OCR-A
64	Reserved	OCR-B
65	Reserved	Fast Draft (for model Z03); DP (for model X03) (See Note 1)
66-FF	Reserved	Reserved

Notes:

1. If printer configuration Host Fast Draft setting is Enabled, then Fast Draft quality is selected. If Host Fast Draft is disabled then DP quality is selected (only for model Z03).
2. If a downloaded font has not been previously downloaded with a Character Font Image Download control (CFID), a Change Font control to select a downloaded font is ignored.
3. The NLQ font style is selected as defined in the Configuration Menu as either Courier or Gothic.

Relative Move Baseline (ESC J)

1B	4A	NN
----	----	----

This control performs a vertical move relative to the current print position.

NN is a one-byte hexadecimal value that specifies the move amount in units of 1/216 inch. The printer will adjust the value to the nearest 1/144 inch. If Automatic Carriage Return on Line Feed is set in the operator panel Configuration Menu, a carriage return is also performed when a Relative Move Baseline code is received (see “Carriage Return (CR)” on page 5).

Normal Density Bit Image Graphics (ESC K)

1B	4B	LL	HH	NN...NN
----	----	----	----	---------

This control prints the supplied bit image data at 60 horizontal pel by 72 vertical pel. Bit image data can be mixed with text data on the same line.

A two-byte count (LL HH) indicates the number of bytes that follow in this control. LL is the least significant byte of the count; HH is the most significant byte. (The number of bytes that follow should equal $HH \times 256 + LL$.) If the count equals X'0000', the control is ignored.

NN...NN are the bytes containing the bit image data. The data format is in 8-bit vertical slices, with the least significant bit the bottom dot and the most significant bit the top dot. B'1' indicates a pel to be printed; B'0' indicates an un-printed pel. Data that exceeds the right margin is discarded.

Dual Density Bit Image Graphics Type 1 (ESC L)

1B	4C	LL	HH	NN...NN
----	----	----	----	---------

This control prints the supplied bit image data at 120 horizontal by 72 vertical pel. Bit image data can be mixed with text data on the same line.

A two-byte count (LL HH) indicates the number of bytes that follow in this control. LL is the least significant byte of the count; HH is the most significant byte. (The number of bytes that follow should equal $HH \times 256 + LL$.) If the count equals X'0000', the control is ignored.

NN .. NN are the bytes containing the bit image data. The data format is in 8-bit vertical slices, with the least significant bit the bottom dot and the most significant bit the top dot. B'1' indicates a pel to be printed; B'0' indicates an un-printed pel. Data that exceeds the right margin is discarded.

Begin Skip Perforation (ESC N)

1B	4E	NN
----	----	----

This control sets the number of lines to be skipped at the bottom of each page. Once this function is activated, it stays active until the End Skip Perforation (ESC O) or Set Page Length (ESC C) control is received or the printer is initialized.

NN is a one-byte hexadecimal value that specifies the number of lines to skip at the bottom of each page. This value must be zero or greater and less than the length of the page in lines (from 0 to 255). Once Begin Skip Perforation is activated, the number of lines that may be printed on a page is the page length minus NN.

End Skip Perforation (ESC O)

1B	4F
----	----

This control ends skip perforation.

Proportional Space Mode (ESC P)

1B	50	NN
----	----	----

This control starts or stops proportional space mode.

NN is a one-byte hexadecimal value that sets proportional space mode on or off.

- If NN is 1, proportional space mode is on.
- If NN is 0, proportional space mode is off.

Note: Code pages OCR-A (code page 876), OCR-B (code page 877), Arabic (code page 864), Cyrillic (code page 855), Thai (code page 874), Extended Arabic (code page 1046), and Farsi Bilingual (code page 1098) are not supported in proportional space mode.

Deselect on Positive Query Reply (ESC Q)

1B	51	NN
----	----	----

This control deselects the printer if the response to the query is positive.

NN is the query printer identifier. If the value matches the printer's ID, the query response is positive and the printer deactivates the Select line. If the query is not positive, the control is ignored.

The printer must be reselected using a DC1 control after a positive response to ESC Q if the printer is to be used.

Query Identifiers: If the emulation mode is set to 4202 III XL, the printer ID is X'16'. If the emulation mode is set to 4247 or 2381, the printer ID is X'B8'.

Set Default Tabs (ESC R)

1B	52
----	----

This control resets both the horizontal and vertical tab stops. The horizontal tab stops are set to every eighth position starting with the ninth column (9, 17, 25,...). The vertical tab stops are cleared.

Begin Subscript/Superscript (ESC S)

1B	53	NN
----	----	----

This control activates subscript and superscript printing. Once this printing is active, it stays active until another Begin Subscript/Superscript control changes the mode, an End Subscript/Superscript control is received, or the printer is initialized.

NN is a one-byte hexadecimal value that activates subscript or superscript printing.

- If NN is 1, subscript mode is active.
- If NN is 0, superscript mode is active.

End Subscript/Superscript (ESC T)

1B	54
----	----

This controls stops subscript and superscript printing.

Set Print Direction (ESC U)

1B	55	NN
----	----	----

This control specifies bidirectional or unidirectional printing.

- If NN is 1, unidirectional printing is selected.
- If NN is 0, bidirectional printing (default) is selected.

Double-Wide Continuous Mode (ESC W)

1B	57	NN
----	----	----

This control turns double-wide printing on or off. When double-wide printing is on, the width of subsequent graphic characters is doubled (the characters per inch value is half of the single character value). For tabs, the font width is not doubled (tab distance is based upon single character width).

NN is a one-byte hexadecimal value that turns double-wide printing on or off.

- If NN is 1, double-wide printing is turned on.
- If NN is 0, double-wide printing is turned off.

Note: Double-Wide Continuous Mode does the same function as Shift Out, except double wide printing is not canceled when a new line begins.

Set Horizontal Margins (ESC X)

1B	58	LL	RR
----	----	----	----

This control sets the left and right margins. The margins are specified in character positions relative to the left edge of the physical page.

LL is a one-byte hexadecimal value from X'00' to X'FF', which specifies the starting print position relative to the left edge of the physical page. If LL equals 0, the left margin is unchanged.

RR is a one-byte hexadecimal number from X'00' to X'FF' that specifies the rightmost print position relative to the first print position. If RR equals 0, the right margin is unchanged.

Notes:

1. Set Horizontal Margins should be followed by a carriage return (CR) control to set the print position to the new left margin.
2. LL should be at least one character width less than the page width.
3. If RR is greater than the page width or is less than LL, RR is set to the page width (MPP).

Dual Density Bit Image Graphics Type 2 (ESC Y)

1B	59	LL	HH	NN...NN
----	----	----	----	---------

This control prints the supplied bit image data at 120 horizontal pel by 72 vertical pel. Bit image data can be mixed with text data on the same line. Horizontally adjacent dots are not allowed and will be removed if specified.

A two-byte count (LL HH) indicates the number of bytes that follow in this control. LL is the least significant byte of the count; HH is the most significant byte. (The number of bytes that follow should equal $HH \times 256 + LL$.) If the count equals X'0000', the control is ignored.

NN...NN are the bytes containing the bit image data. The data format is in 8-bit vertical slices, with the least significant bit the bottom dot and the most significant bit the top dot. B'1' indicates a pel to be printed; B'0' indicates an un-printed pel. Data that exceeds the right margin is discarded.

High Density Bit Image Graphics (ESC Z)

1B	5A	LL	HH	NN...NN
----	----	----	----	---------

This control prints the supplied bit image data at 240 horizontal per by 72 vertical pel. Bit image data can be mixed with text data on the same line.

A two-byte count (LL HH) indicates the number of bytes that follow in this control. LL is the least significant byte of the count; HH is the most significant byte. (The number of bytes that follow should equal $HH \times 256 + LL$.) If the count equals X'0000', the control is ignored.

NN...NN are the bytes containing the bit image data. The data format is in 8-bit vertical slices, with the least significant bit the bottom dot and the most significant bit the top dot. B'1' indicates a pel to be printed; B'0' indicates an un-printed pel. Data that exceeds the right margin is discarded.

Print All Characters (ESC \)

1B	5C	LL	HH
----	----	----	----

This control forces a specified number of characters to be interpreted as graphic characters, including those that occur in the space normally reserved for controls.

A two-byte count (LL HH) indicates the number of bytes to be interpreted as printable graphics. LL is the least significant byte of the count; HH is the most significant byte. (The number of bytes that follow should equal $HH \times 256 + LL$.) If the count equals X'0000', the control is ignored.

Reverse Line Feed (ESC J)

1B	5D
----	----

This command causes the contents of the buffer to be printed and advances the paper one line in the reverse direction from the paper path.

Note: If Printer Compatibility 4 - Automatic Carriage Return on Line Feed is set to Enabled in the Configuration Menu, the next print position is print position 1 at the left margin. If Printer Compatibility 4 - Automatic Carriage Return on Line Feed is set to Disabled, the next print position is the current print position.

Print Single Character (ESC ^)

1B	5E
----	----

This control specifies that the next character to follow is to be interpreted as a graphic character, including those characters that occur in the space normally reserved for controls.

Continuous Overscore (ESC _)

1B	5F	NN
----	----	----

This control turns on and off the continuous overscore function. All graphic characters and spaces that are bounded by start and stop versions of this control are overscored. White space caused by horizontal tabs is not overscored.

NN is a one-byte hexadecimal value that turns overscore on or off.

- If NN is 1, continuous overscore is on.
- If NN is 0, continuous overscore is off.

Relative Move Right (ESC d)

1B	64	N1	N2
----	----	----	----

This command moves the print position to the right (from the current position) in increments of 1/120 of an inch.

Bytes N1 and N2 indicate the move distance based on the following:

$$(N1 + [N2 \times 256])/120$$

Relative Move Left (ESC e)

1B	65	N1	N2
----	----	----	----

This command moves the print position to the left (from the current position) in increments of 1/120 of an inch.

Bytes N1 and N2 indicate the move distance based on the following:

$$(N1 + [N2 \times 256])/120$$

Select Line Scoring (ESC [-)

1B	5B	2D	02	00	N1	N2
----	----	----	----	----	----	----

This command selects underscore, strikethrough, and overscore. This command is supported in 4247 or 2381 emulation mode only.

The values for N1 are:

X'01' Underscore
X'02' Strikethrough
X'03' Overscore
X'00' Cancel
X'01' Single Line
X'02' Double Line

Set Presentation Highlight (SPH) (ESC [@)

1B	5B	40	LL	HH	M1	M2	M3	M4
----	----	----	----	----	----	----	----	----

SPH activates or deactivates double wide, double high, and italic printing. This command is supported in 4247, 4202 III XL, and 2381 emulation with some exceptions as noted.

Once these highlights are active, they remain active until terminated, either by another SPH command or an initialization. If double wide printing is activated by an SPH, a DC4 control can also cancel it.

A two-byte count (LL HH) indicates the number of bytes that follow in this control. LL is X'00' to X'04'. HH is always X'00'. If the count equals X'0000', the control is ignored.

M1 .. M4 turn double wide, double high, or italics on or off.

M1 is a one-byte hexadecimal value that turns italics on or off as follows:

X'00' No change
X'01' Italics on (2381 and 4247 only)
X'02' Italics off (2381 and 4247 only)

M2 is always X'00'.

M3 is a one-byte hexadecimal that controls line feeds and character height (vertical spacing) as follows:

X'00' No change to line feed, no change to character height
X'01' Line feeds unchanged, standard character height
X'02' Line feeds unchanged, double character height
X'10' Single line feeds, character height unchanged (4202 only)
X'11' Single line feeds, standard character height
X'12' Single line feeds, double character height
X'20' Double line feeds, character height unchanged (4202 only)
X'21' Double line feeds, standard character height
X'22' Double line feeds, double character height

M4 is a one-byte hexadecimal value that turns double wide on or off as follows:

X'00' No Change
X'01' Turn double wide off
X'02' Turn double wide on
X'10' Single line feeds (2381 and 4247 only)
X'20' Double line feeds (2381 and 4247 only)

Set Font Global (SFG) (ESC [I)

1B	5B	49	02	00	HF	LF
----	----	----	----	----	----	----

This control selects font and pitch based on the values of HF and LF. (Supported in 4247 or 2381 emulation mode only.)

HF	LF	Font and Pitch
00	0B	Courier 10
01	EB	Courier 12
01	EC	Courier 15
01	ED	Courier 17
01	EE	Courier 20
00	AB	Courier Proportional

HF	LF	Font and Pitch
00	24	Gothic 10
01	8F	Gothic 12
01	8E	Gothic 15
01	8D	Gothic 17
01	8C	Gothic 20
00	AE	Gothic Proportional

Set Initial Conditions (SIC) (ESC [K)

1B	5B	4B	LL	HH	INIT	ID	P1	P2
----	----	----	----	----	------	----	----	----

This control initializes the printer.

A two-byte count (LL HH) indicates the number of bytes that follow in this control. LL is the least significant byte of the count; HH is the most significant byte. (HH is always X'00' for this command.) The number of bytes is counted from the INIT byte.

The INIT byte is processed the same way in 4247, 4202 III XL, or 2381 emulation mode, but causes different results in the P1 and P2 parameters, depending on the ID byte. The values for the INIT byte are:

INIT	Mode Byte	
	X'00'	Initializes printer to user-defined settings; downloaded fonts are not initialized.
	X'01'	Initializes printer to user-defined settings; downloaded fonts are initialized.
	X'04'	Initializes printer to factory settings; downloaded fonts are not initialized. See Note.
	X'05'	Initializes printer to factory settings; downloaded fonts are initialized. See Note.
	X'FE'	Initializes printer to user-defined settings; downloaded fonts are initialized. Settings are saved in non-volatile memory (NVM).
	X'FF'	Initializes printer to factory settings; downloaded fonts are initialized. See Note. Settings are saved in non-volatile memory (NVM).
ID	Printer ID Byte:	
	X'B6'	For 4247 or 2381 emulation
	X'03' or X'16'	For 4202 III XL emulation
P1	Parameter Byte for 4247 or 2381 Emulation	
	X'00'	No Emulation Change
	X'01'	Switch to 2381 emulation
	X'02'	Switch to Epson FX printer emulation
	X'03' to X'FF'	No Emulation Change

P1 Parameter Byte for 4201 III XL Emulation

Bit	On	Off
7 Discard Byte	Ignore	Process
6 Reserved		
5 Alarm	Disable	Enable
4 Auto CR	CR on Vertical Movement	No CR on Vertical Movement
3 Auto LF	Auto LF after CR	No Auto LF after CR
2 Form Length	12 inch forms	11 inch forms
1 Zero	Slashed Zero	Normal Zero
0 Character Set	PC Char Set 2	PC Char Set 1

P2 Parameter Byte for 4202 III XL Emulation

Bit	On	Off
7 Discard Byte	Ignore	Process
6 Print Language	CP 850 Multilingual	CP 437 ASCII
5 Direction	Unidirectional	Bidirectional
4 20 Condense	12+Condense = 12 CPI	12+Condense = 20 CPI
3 Select NLQ	NLQ Gothic	NLQ Courier
2 Form Feed	Ignore FF if at TOF	Honor all FF
1 Line Length	8 inch line	13.6 inch line
0 Sheet Feeder	Enable	Disable

Notes: The following parameters are changed to the manufacturing default by the INIT control byte in the ASCII Configuration Menu only:

- Characters Per Inch (CPI)
- Lines Per Inch (LPI)
- Maximum Print Position (MPP)
- Maximum Page Length (MPL)
- Print Language
- Print Quality
- NLQ Typeface
- Character Set
- Printer Compatibility 3 - Automatic Line Feed on Carriage Return
- Printer Compatibility 4 - Automatic Carriage Return on Line Feed
- Printer Compatibility 5 - Form Feed Suppression
- Printer Compatibility 8 - Slashed Zero
- Printer Compatibility 9 - 20 CPI
- Alarm Control

The following parameters are NOT modified by the INIT control byte:

- Values in Any Custom Set
- Active Custom Set
- Default Attachment Selection
- Rear Tractor Use
- ASCII Configuration:
 - Emulation Mode
 - Printer Compatibility 6 – Init

- Printer Compatibility 7 – Condensed Print
- Interface Type
- Input Buffer Size
- Select-In Signal
- AutoFeed XT
- All Printer Adjustments Values
- All Printer Setup Values
- Display Language
- All Vital Product Data
- Active Form Path

Select Code Page (SCP) (ESC [T)

1B	5B	54	04	00	00	00	HC	LC
----	----	----	----	----	----	----	----	----

This control selects a code page for printing where HC and LC specify the code page in hexadecimal. (Supported in 4247 or 2381 emulation mode only.)

The following table shows the values for HC and LC:

HC	LC	Character Set
01	B5	CP437 USA (Personal Computer) A-54
02	E1	CP737 Greek (MS DOS)
03	2D	CP813 Greek/Latin (ISO 8859-7)
03	33	CP819 Latin 1 (ISO 8859-1)
03	52	CP850 PC Multilingual
03	53	CP851 Old Greek
03	54	CP852 Latin 2/ROECE
03	55	CP853 Latin 3 (PC)
03	57	CP855 Cyrillic (PC)
03	59	CP857 Latin 5-Turkey + euro
03	5A	CP858 PC Multilingual + euro
03	5C	CP860 Portuguese
03	5D	CP861 Icelandic
03	5E	CP862 Hebrew
03	5F	CP863 Canadian French
03	60	CP864 Arabic
03	61	CP865 Danish/Norwegian
03	62	CP866 PC Data, Cyrillic, Russian
03	65	CP869 Greek New + euro
03	6A	CP874 Thai
03	6C	CP876 OCR-A
03	6D	CP877 OCR-B
03	90	CP912 Latin 2 (ISO 8859-2)
03	91	CP913 Latin 3 (ISO 8859-3)
03	92	CP914 Latin 4 (ISO 8859-4)

HC	LC	Character Set
03	93	CP915 Cyrillic (ISO 8859-5)
03	94	CP916 Latin 8 (ISO 8859-8)
03	98	CP920 Latin 5 (ISO 8859-9)
03	99	CP921 Baltic Multilingual
03	9A	CP922 Estonian
03	9B	CP923 Latin 9 (ISO 8859-15)
03	EE	CP1006 Urdu
04	16	CP1046 Arabic Extended
04	41	CP1089 Latin 6 (ISO 8859-6)
04	4A	CP1098 Farsi (Personal Computer)
04	5C	CP1116 Estonian (Personal Computer)
04	5D	CP1117 Latvian (Personal Computer)
04	5E	CP1118 Lithuanian (Personal Computer)
04	E2	CP1250 Central Europe Latin 2
04	E3	CP1251 Cyrillic Windows® + euro

Note: The following languages are all supported within code page 850 (PC Multilingual):

Austrian/German	Italian
Austrian/German (alternate)	Japanese English
Belgian	Spanish/Spanish speaking
Brazilian	Spain (alternate)
Finnish/Swedish	United Kingdom
Finnish/Swedish (alternate)	U.S.A./Canada
French/French Azerty	Yugoslav

Set Print Quality (SPQ) (ESC [d)

1B	5B	54	04	00	00	00	HC	LC
----	----	----	----	----	----	----	----	----

This control allows the host application to specify the desired print quality when the printer is in 4247 or 2381 emulation mode. The setting remains in effect until changed by another Set Print Quality control or until the printer is initialized. Bit image graphics (ESC K, L, Y, and Z) are not affected. Highlighting modes, such as italics, emphasized, and double wide remain active if they were active when the SPQ control was activated.

QQ specifies the quality of subsequent printing. Valid values are X'00' to X'FE' as follows:

Hex	Function
X'00'	No change (Default)
X'01 - 3F'	Low quality level (highest speed) See Note
X'40 - 7F'	Medium quality level (medium speed)
X'80 - FE'	High quality level (lowest speed)
X'FF'	Printer Initialization (Default)

Hex	Function
Note: If printer configuration Host Fast Draft setting is Enabled then Fast Draft quality is selected. If Host Fast Draft is disabled then DP quality is selected. (Model Z03 only)	

4247 Commands

Control	Hex	Name
DC4 DC4 ESC ! NN 1 PP EM	14 14 1B 21 01	Select EAN-8 Bar Code
DC4 DC4 ESC ! NN 2 PP EM	14 14 1B 21 02	Select EAN-13 Bar Code
DC4 DC4 ESC ! NN 3 PP EM	14 14 1B 21 03	Select UPC-A Bar Code
DC4 DC4 ESC ! NN 4 PP EM	14 14 1B 21 04	Select MSI Bar Code
DC4 DC4 ESC ! NN 5 PP EM	14 14 1B 21 05	Select UPC-E Bar Code
DC4 DC4 ESC ! NN 6 PP EM	14 14 1B 21 06	Select UPC 2-Digit Bar Code (Magazine)
DC4 DC4 ESC ! NN 7 PP EM	14 14 1B 21 07	Select UPC 5-Digit Bar Code (Magazine)
DC4 DC4 ESC ! NN 17 PP EM	14 14 1B 21 11	Select 2 of 5 INTERLEAVED Bar Code
DC4 DC4 ESC ! NN 18 PP EM	14 14 1B 21 12	Select 2 of 5 INDUSTRIAL Bar Code
DC4 DC4 ESC ! NN 19 PP EM	14 14 1B 21 13	Select 2 of 5 MATRIX Bar Code
DC4 DC4 ESC ! NN 20 PP EM	14 14 1B 21 14	Select CODE 3 of 9 Bar Code
DC4 DC4 ESC ! NN 22 PP EM	14 14 1B 21 16	Select CODABAR Bar Code
DC4 DC4 ESC ! NN 23 PP EM	14 14 1B 21 17	Select CODE 128 Bar Code
DC4 DC4 ESC ! NN 24 PP EM	14 14 1B 21 18	Select POSTNET Bar Code
DC4 DC4 ESC (GS {N1} {DATA1} {N2} {DATA2} EM	14 14 1B 28 1D DD..DD 1D DD..DD 19	Print Bar Code Selection
DC4 DC4 ESC @	14 14 1B 40	Reinitialize Printer
DC4 DC4 ESC 1 NN	14 14 1B 31	Set Vertical Spacing n/144 Inch
DC4 DC4 ESC 3 1	14 14 1B 33 31	Set Vertical Spacing to 12 Lines/30mm
DC4 DC4 ESC 3 3	14 14 1B 33 33	Set Vertical Spacing to 3 Lines/30mm
DC4 DC4 ESC 3 4	14 14 1B 33 34	Set Vertical Spacing to 4 Lines/30mm
DC4 DC4 ESC 3 6	14 14 1B 33 36	Set Vertical Spacing to 6 Lines/30mm
DC4 DC4 ESC 3 8	14 14 1B 33 38	Set Vertical Spacing to 8 Lines/30mm
DC4 DC4 ESC 5	14 14 1B 35	Eject Single Sheet or Form Feed
DC4 DC4 ESC A	14 14 1B 41	Set 15, 17.1, or 20 CPI
DC4 DC4 ESC N	14 14 1B 4E	Load or Park Fanfold from a Rear Path
DC4 DC4 ESC T	14 14 1B 54	Load or Park Fanfold from a Front Path
DC4 DC4 ESC Y	14 14 1B 59	Select Emulation
DC4 DC4 ESC Z	14 14 1B 5A	Select AFTA in Column
DC4 DC4 ESC g	14 14 1B 67	Select Resident Font
DC4 DC4 ESC h	14 14 1B 68	Request to Read Configuration
DC4 DC4 ESC h	14 14 1B 68	Printer Configuration Response
DC4 DC4 ESC i	14 14 1B 69	Write Configuration Response
DC4 DC4 ESC i	14 14 1B 69	Write Configuration Acknowledgement

Control	Hex	Name
DC4 DC4 ESC p	14 14 1B 70	Select Print Quality

Select EAN-8 Bar Code (DC4 DC4 ESC ! NN 1 PP EM)

14	14	1B	21	NN	01	PP	19
----	----	----	----	----	----	----	----

This control selects the EAN-8 bar code.

The DATA field must contain only ASCII numeric (0 to 9) data, and must be eight bytes long, check digit included.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

00 Do not print human readable characters
01 Print human readable characters

Select EAN-13 Bar Code (DC4 DC4 ESC ! NN 2 PP EM)

14	14	1B	21	NN	02	PP	19
----	----	----	----	----	----	----	----

The control selects the EAN-13 bar code.

The DATA field must contain only ASCII numeric (0 to 9) data, and must be thirteen bytes long, check digit included.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

00 Do not print human readable characters
01 Print human readable characters

Select UPC-A Bar Code (DC4 DC4 ESC ! NN 3 PP EM)

14	14	1B	21	NN	03	PP	19
----	----	----	----	----	----	----	----

The control selects the UPC-A bar code.

The DATA field must contain only ASCII numeric (0 to 9) data, and must be twelve bytes long, including a system digit at the leftmost position and a check digit at the rightmost position of the data field.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

- 00 Do not print human readable characters
- 01 Print human readable characters

Select MSI Bar Code (DC4 DC4 ESC ! NN 4 PP EM)

14	14	1B	21	NN	04	PP	19
----	----	----	----	----	----	----	----

The control selects the MSI bar code.

The DATA field for this bar code does not have a defined length, but the DATA field must contain only ASCII numeric (0 to 9) data.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

- 00 Do not print human readable characters
- 01 Print human readable characters

Select UPC-E Bar Code (DC4 DC4 ESC ! NN 5 PP EM)

14	14	1B	21	NN	05	PP	19
----	----	----	----	----	----	----	----

The control selects the UPC-E bar code.

The DATA field must contain only ASCII numeric (0 to 9) data, and must be eight bytes long, including a system digit at the leftmost position and a check digit at the rightmost position of the data field. The system digit must be a 0 or 1.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

- 00 Do not print human readable characters
- 01 Print human readable characters

Select UPC 2-Digit Bar Code (Magazine) (DC4 DC4 ESC ! NN 6 PP EM)

14	14	1B	21	NN	06	PP	19
----	----	----	----	----	----	----	----

This control selects the UPC 2-Digit bar code.

The DATA field must contain only ASCII numeric (0 to 9) data, and must be three bytes long, check digit included.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

- 00 Do not print human readable characters

01 Print human readable characters

Select UPC 5-Digit Bar Code (Magazine) (DC4 DC4 ESC ! NN 7 PP EM)

14	14	1B	21	NN	07	PP	19
----	----	----	----	----	----	----	----

This control selects the UPC 5-Digit bar code.

The DATA field must contain only ASCII numeric (0 to 9) data, and must be six bytes long, check digit included.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

00 Do not print human readable characters
01 Print human readable characters

Select 2 of 5 INTERLEAVED Bar Code (DC4 DC4 ESC ! NN 17 PP EM)

14	14	1B	21	NN	11	PP	19
----	----	----	----	----	----	----	----

The control selects the 2 of 5 Interleaved bar code.

The DATA field for this bar code does not have a defined length, but the number of data bytes must be even. The DATA field must contain only ASCII numeric (0 to 9) data.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

00 Do not print human readable characters
01 Print human readable characters

Select 2 of 5 INDUSTRIAL Bar Code (DC4 DC4 ESC ! NN 18 PP EM)

14	14	1B	21	NN	12	PP	19
----	----	----	----	----	----	----	----

The control selects the 2 of 5 Industrial bar code.

The DATA field for this bar code does not have a defined length, but the DATA field must contain only ASCII numeric (0 to 9) data.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

00 Do not print human readable characters
01 Print human readable characters

Select 2 of 5 MATRIX Bar Code (DC4 DC4 ESC ! NN 19 PP EM)

14	14	1B	21	NN	13	PP	19
----	----	----	----	----	----	----	----

The control selects the 2 of 5 Matrix bar code.

The DATA field for this bar code does not have a defined length, but the DATA field must contain only ASCII numeric (0 to 9) data.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

00 Do not print human readable characters
01 Print human readable characters

Select CODE 3 of 9 Bar Code (DC4 DC4 ESC ! NN 20 PP EM)

14	14	1B	21	NN	14	PP	19
----	----	----	----	----	----	----	----

This control selects the Code 3 of 9 bar code.

The DATA field for this bar code does not have a defined length, but must start and end with an *.

The DATA field may contain alphanumeric data as follows:

0 1 2 3 4 5 6 7 8 9
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
Space - . \$ / + %
* (as start/stop character)

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

00 Do not print human readable characters
01 Print human readable characters

Select CODABAR Bar Code (DC4 DC4 ESC ! NN 22 PP EM)

14	14	1B	21	NN	16	PP	19
----	----	----	----	----	----	----	----

This control selects the Codabar bar code.

The DATA field for this bar code does not have a defined length, and must contain only the data characters listed below. Any combination of start/stop characters is allowed.

0 1 2 3 4 5 6 7 8 9 - \$: / . +
A B C D E N T * a b c d e n t (as start/stop characters)

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

- 00 Do not print human readable characters
- 01 Print human readable characters

Select CODE 128 Bar Code (DC4 DC4 ESC ! NN 23 PP EM)

14	14	1B	21	NN	17	PP	19
----	----	----	----	----	----	----	----

This control selects the Code 128 bar code.

The DATA field for this bar code does not have a defined length, and must contain only the data characters belonging to the selected ASCII character set, including control characters.

Since GS and EM are control codes, the host application must set the high-order bit of the control code to allow the printer to distinguish between encodable data and terminator strings.

Human Readable Characters will be centered below the bar code and can be wider than the encoded area. The user is responsible for allowing space for Human Readable Characters to print without overlapping adjacent data.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

- 00 Do not print human readable characters
- 01 Print human readable characters

Select POSTNET Bar Code (DC4 DC4 ESC ! NN 24 PP EM)

14	14	1B	21	NN	18	PP	19
----	----	----	----	----	----	----	----

This control selects the POSTNET [ZIP, ZIP+4, or Delivery Point Bar Code (DPBC)] bar code.

The DATA field for this bar code must contain only ASCII numeric (0 to 9) data. A data string of all zeroes will be encoded if other than numeric data is detected in the job stream.

POSTNET bar code does not print Human Readable Characters, regardless of the PP byte. POSTNET uses the tall and short bars required by the United States Postal Service standard, and encodes numeric data streams regardless of length.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

- 00 Do not print human readable characters
- 01 Print human readable characters

Print Bar Code Selection (DC4 DC4 ESC (GS {N1} {DATA1} GS {N2} {DATA2} EM)

14	14	1B	28	1D	DD...DD	1D	DD...DD	19
----	----	----	----	----	---------	----	---------	----

This sequence causes the bar code symbol to be printed according to the Bar Code Selection command. Sequential bar codes of the same type and height may be printed. GS N# defines the distance from the beginning of the line or between two bar code symbols in multiples of 1/72 of an inch. This command must be closed with an EM character.

Note: Bar code symbols will print over any descenders in the previous character box if any text is present.

Example 1:

Print an EAN-8 bar code symbol, one inch from the right margin with the data set of 12345678.

ASCII: DC4 DC4 ESC (GS 72 12345678 EM
HEX: 14 14 1B 28 1D 48 31 32 33 34 35 36 37 38 19

Example 2:

Print two Code 3 of 9 bar code symbols. The first symbol on the right margin; the second symbol one inch to the right of the first symbol. Data sets are ABC+0123 and 12345678

ASCII: DC4 DC4 ESC (GS 0 *ABC+123* GS 72 *1234* EM
HEX: 14 14 1B 28 1D 00 2A 41 42 43 2B 31 32 33 2A
1D 48 2A 31 32 33 34 2A 19

Reinitialize Printer (DC4 DC4 ESC @)

14	14	1B	40
----	----	----	----

This command reinitializes the printer. It resets the printer mode and clears the buffer of printable data.

Set Vertical Spacing n/144 Inch (DC4 DC4 ESC 1 NN)

14	14	1B	31	NN
----	----	----	----	----

This control sets a line spacing value for subsequent line feeds.

NN is a one-byte hexadecimal number that specifies the line spacing value of NN/144 inches. The value of NN is 1 to 255.

Set Vertical Spacing 12 Lines/30mm (DC4 DC4 ESC 3 1)

14	14	1B	33	31
----	----	----	----	----

This command sets line spacing to 12 lines per 30 mm.

Set Vertical Spacing 3 Lines/30mm (DC4 DC4 ESC 3 3)

14	14	1B	33	33
----	----	----	----	----

This command sets line spacing to 3 lines per 30 mm.

Set Vertical Spacing 4 Lines/30mm (DC4 DC4 ESC 3 4)

14	14	1B	33	34
----	----	----	----	----

This command sets line spacing to 4 lines per 30 mm.

Set Vertical Spacing 6 Lines/30mm (DC4 DC4 ESC 3 6)

14	14	1B	33	36
----	----	----	----	----

This command sets line spacing to 6 lines per 30 mm.

Set Vertical Spacing 8 Lines/30mm (DC4 DC4 ESC 3 8)

14	14	1B	33	38
----	----	----	----	----

This command sets line spacing to 8 lines per 30 mm.

Eject Single Sheet or Form Feed (DC4 DC4 ESC 5)

14	14	1B	35
----	----	----	----

This command causes a form feed on fanfold forms.

Set 15, 17.1, 20 CPI (DC4 DC4 ESC A)

14	14	1B	41	NN
----	----	----	----	----

This command sets horizontal spacing (characters per inch) to 15, 17.1 or 20.

The values for NN are:

- 4 15 CPI
- 5 17.1 CPI
- 6 20 CPI

Load or Park Fanfold from a Rear Path (DC4 DC4 ESC N)

14	14	1B	4E	NN
----	----	----	----	----

This command loads or performs the Park function for fanfold paper fed from the rear path.

The values for NN are:

- 0 The printer selects the rear path. If fanfold paper is already loaded in a paper path that is not requested, the printer automatically performs the Park function before loading the rear path. The printer will then load the fanfold paper once data is received. For more information on the Park function, see "PARK/PATH" in "Chapter 2. Understanding the Operator Panel" in the *User's Guide* for your printer.
- 1 The printer performs the Park function for forms in the rear path.

Load or Park Fanfold from a Front Path (DC4 DC4 ESC T)

14	14	1B	54	NN
----	----	----	----	----

This command loads or performs the Park function for fanfold paper fed from the front path.

The values for NN are:

- 0 The printer selects the front path. If fanfold paper is already loaded in a paper path that is not requested, the printer automatically performs the Park function before loading the front path. The printer will then load the fanfold paper once data is received. For more information on the Park function, see "PARK/PATH" in "Chapter 2. Understanding the Operator Panel" in the *User's Guide* for your printer.
- 1 The printer performs the Park function for forms in the front path.

Select Emulation (DC4 DC4 ESC Y)

14	14	1B	59	NN
----	----	----	----	----

This command selects the printer emulation mode.

The values for NN are:

- 1 Epson FX 1050
- 2 4202 Proprinter III XL
- 5 4247 or 2381 Personal Printer

Select AFTA in Column (DC4 DC4 ESC Z)

14	14	1B	5A	NN
----	----	----	----	----

This command selects the column at 10 CPI where the Automatic Forms Thickness Adjustment (AFTA) will be made.

The value for NN is the column number.

Select Resident Font (DC4 DC4 ESC g)

14	14	1B	67	NN
----	----	----	----	----

This command selects the resident font based on the following values of NN:

- 0 Courier
- 1 Gothic
- 128 OCR-B
- 129 OCR-A

Request to Read Configuration (DC4 DC4 ESC h)

14	14	1B	68
----	----	----	----

This command requests the printer to send its configuration saved in non-volatile memory (NVM).

The printer must be configured for 1284 Parallel mode.

Printer Configuration Response (DC4 DC4 ESC h)

14	14	1B	68	LL	HH	TT	SS	D1...DN	CS
----	----	----	----	----	----	----	----	---------	----

This is the response Request to Read Configuration command.

The printer must be configured for 1284 Parallel mode. LL and HH indicate the number of bytes that follow this control. LL is the least significant byte of the count and HH is the most significant byte. (The number of bytes that follow equal $HH \times 256 + LL$.)

The other values are:

TT Model Type

SS Model Sub-type

D1...DN

Configuration Data

CS Checksum of the data bytes

Write Configuration Response (DC4 DC4 ESC i)

14	14	1B	69	LL	HH	TT	SS	D1...DN	CS
----	----	----	----	----	----	----	----	---------	----

This command writes configuration data to non-volatile memory (NVM).

The printer must be configured for 1284 Parallel mode. LL and HH indicate the number of bytes that follow this control. LL is the least significant byte of the count and HH is the most significant byte. (The number of bytes that follow equal $HH \times 256 + LL$.)

The other values are:

TT Model Type

SS Model Sub-type

D1...DN

Configuration Data

CS Checksum of the data bytes

Write Configuration Acknowledgement (DC4 DC4 ESC i)

14	14	1B	69	NN
----	----	----	----	----

This command acknowledges that the configuration was written to the printer. This is the response to the Write Configuration command.

The printer must be configured for 1284 Parallel mode.

NN is a single byte defined as follows:

X'00' Configuration Saved (Successful)

X'01' Configuration Not Saved (Error)

Select Print Quality (DC4 DC4 ESC p)

14	14	1B	70	NN
----	----	----	----	----

The values of NN are:

0	Fast Draft (Model Z03 only)
1	DP
2	DP Text
3	NLQ

Buffer Terminating Conditions

The following controls cause buffered data to be released for printing:

- Carriage Return
- Line Feed
- Reverse Line Feed
- Form Feed
- Horizontal Tab (if there is print head movement)
- Vertical Tab
- Backspace
- Set 1/8 Inch Line Spacing
- Set 7/72 Inch Line Spacing
- Set Graphics Line Spacing
- Select $n/72$ Inch Line Spacing
- Invoke Text Line Spacing (if the line spacing is changed)
- Relative Move Right
- Relative Move Left
- Relative Move Baseline
- Shift In/Condensed Print
- Shift Out/Double-Wide Print
- Device Control 4/Cancel Double-Wide Print
- Begin Subscript/Superscript
- End Subscript/Superscript
- Begin Double-Strike Print
- End Double-Strike Print
- Begin Emphasized Print
- End Emphasized Print
- Set Presentation Highlight
- Continuous Overscore
- Auto Underscore
- Device Control 2/Select 10 CPI
- Set 12 CPI
- Proportional Space Mode
- Change Font
- Normal Density Bit Image Graphics
- Dual Density Bit Image Graphics Type 1
- Dual Density Bit Image Graphics Type 2
- High Density Bit Image Graphics
- Set Initial Conditions
- Select Score Line (2381 and 4247 only)
- Unidirectional Printing
- Set Horizontal Margins

The following conditions also cause buffered data to be released for printing:

- Parallel -INIT
- Automatic Line Wrap

An automatic line wrap consists of a carriage return and line feed inserted after the maximum number of characters has been printed on a line. The next character is then printed at the left margin on the following line. Automatic line wrap occurs for text data but not for bit image graphics.

Chapter 2. Epson FX-1050 Data Stream

When the 4247 is in Epson emulation mode, the printer can print files coded for the Epson FX-1050 printer using the Epson ESC/P printer control language. Use the Configuration menu to select Epson FX emulation mode as the active printer configuration.

The following chapter describes the Epson FX-1050 emulation host control codes that are supported for the printer.

Print Job Processing

There are no Epson FX-1050 controls that explicitly define print job boundaries. A print job for the 4247 is established by the host system and consists of any set of related print objects. A print job could be as short as one character or could be many pages long.

As an aid to the printer operator, the printer provides a Processing indicator on the operator panel. When the Processing indicator is flashing, it indicates that data is currently being received, processed, or printing, or that data is buffered in the printer but cannot be immediately printed. If the Processing indicator is not lit, then all print jobs have been completed.

Configuration parameter values can be changed at any time; however, to obtain predictable results, changes to operator panel configuration parameter values should be made before the print job is sent to the printer and after the previous print job has completed printing. Changing configuration parameter values while a print job is in progress may cause unpredictable results.

We recommend the following to ensure that your print jobs run correctly:

- Establish a known print environment, and end any previous print job. Start each print job with an Initialize Printer/control. This control resets the printer environment to the default settings. You can then set additional controls depending on your print job environment.
- End each print job with a Form Feed control. This control causes all data to be printed, and the current position is set to the top-of-form position.
- If a print job is abnormally terminated, the job should be canceled. See “Cancel Print” in “Chapter 2. Understanding the Operator Panel” in the *User's Guide* for your printer.

Page Printing Concept

The 4247 processes print jobs in terms of pages, as well as in lines and columns. A page is a logical entity whose boundaries are defined by the width and the page length. These boundaries are established during printer initialization using the printer defaults, and can be changed using the Configuration menu or by issuing the appropriate data stream controls.

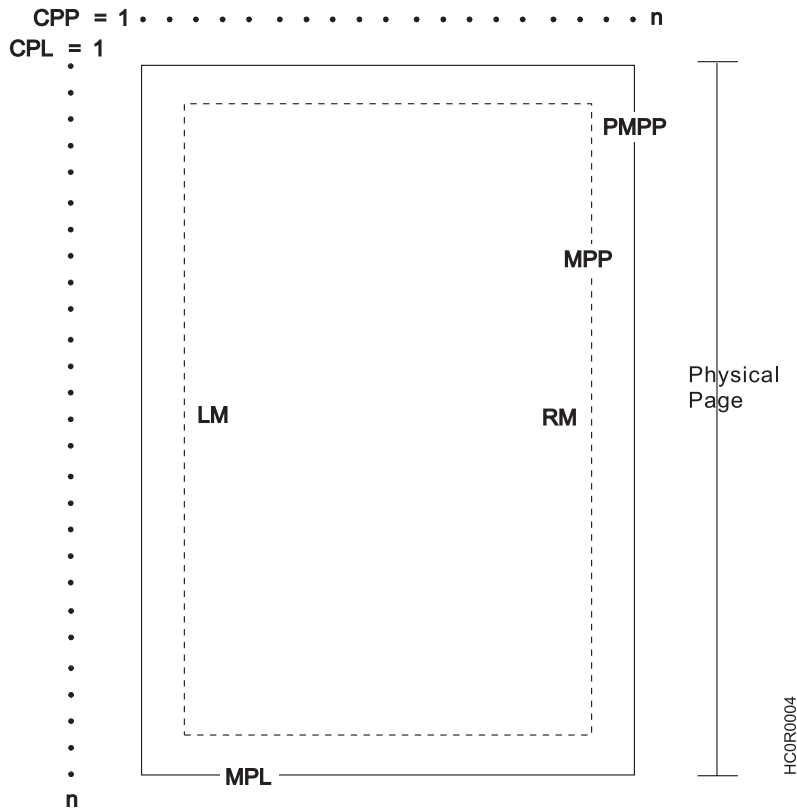
As a job prints, the printer controller maintains both the logical position and the physical position on the page. If a print job does not end with a proper job terminator (for example, Form Feed), then:

- All data for the current page may not print
- The next print job may be misaligned on the form
- Residual data from a previous job could print with the new job.

Page Presentation

Many Epson ESC/P commands (tabs, margins, line spacing, for example) are described in terms of the presentation surface. A presentation surface is a two-dimensional surface upon which the printer positions symbols according to controls embedded in the incoming data stream. The presentation surface is defined in absolute terms by the width and depth parameters of the page size control commands (Set Page

Length, Set Horizontal Margins, for example). The physical print position does not move outside the range of these two parameters. The left margin (LM) and right margin (RM) are variable parameters within the presentation surface. The logical print position does not move outside the range of the vertical margins nor outside the horizontal margins + 1. The following figure shows the presentation surface and the relationships of some of these parameters.



CPP

- CPP** Current Print Position ($LM \leq CPP \leq RM$).
- CPL** Current Print Line
- MPP** Maximum Print Position (in characters at current CPI)
- PMPP** Physical Maximum Print Position. The largest number of characters that can be placed on one line of the surface (the largest value that MPP can assume).
- LM** Left Margin
- RM** Right Margin
- MPL** Maximum Page Length (in lines at current LPI)

Notes:

1. The host should set the limits of the presentation surface if the default or previous values are not acceptable.
2. The operator should align the physical paper so that it matches the logical presentation surface.

Also created with this surface is a pair of numbers (CPL and CPP) which specify the line number and column number where the next graphic will be printed. These internal values are the logical position on the presentation surface.

The variable parameters have default values which are established when the printer is initialized. The standard power-on defaults are:

MPP (width) Operator panel setting

MPP (depth)	Operator panel setting
CPI	Operator panel setting
LPI	Operator panel setting
LM	0 inches (Column 1)
RM	Equal to MPP
HT	Horizontal tabs are set at each 8th column, starting with column 9 (9, 17, 25, 33, and so on.)
VT	Vertical tabs are all cleared

One-Byte Controls

Note: Control hex values within parentheses are recognized only within PC Character Set 1.

The printer uses the following one-byte controls:

Control	Hex	Name
NUL	00 (80)	Null (no operation)
BEL	07 (87)	Bell
BS	08 (88)	Backspace
HT	09 (89)	Horizontal Tab
LF	0A (8A)	Line Feed
VT	0B (8B)	Vertical Tab
FF	0C (8C)	Form Feed
CR	0D (8D)	Carriage Return
SO	0E (8E)	Shift Out (Double-Wide Print)
SI	0F (8F)	Shift In (Condensed Print)
DC1	11 (91)	Device Control 1 (Parallel Select)
DC2	12 (92)	Device Control 2 (Cancel Condensed Print)
DC3	13 (93)	Device Control 3 (Parallel Deselect)
DC4	14 (94)	Device Control 4 (Cancel Double-Wide Print)
CAN	18 (98)	Cancel
SP	20	Space
DEL	7F	Delete Character

Null (NUL)

00

This control terminates the Set Horizontal Tab and Set Vertical Tab control codes. The printer ignores NUL by itself.

Bell (BEL)

07

This control causes the audible alarm to sound.

Backspace (BS)

08

This control moves the print position horizontally one character width to the left. If the current print position is at the left margin, the printer ignores this command.

Horizontal Tab (HT)

09

This control moves the print position to the next horizontal tab stop. If there are no tab stops to the right, or if the next tab stop is beyond the current right margin, the control is ignored.

Line Feed (LF)

0A

This control advances the paper one line. The horizontal position does not change unless automatic carriage return mode is activated from the operator panel Configuration menu. If the paper advance crosses the bottom margin, the printer completes all deferred printing on the current page and then does an automatic form feed.

If skip perforation mode is active and the bottom margin is crossed, the vertical position on the new page following the automatic form feed will be the top-of-form position. If skip perforation is not active, the vertical position on the new page is the point immediately following the previous print line.

Vertical Tab (VT)

0B

This control causes the vertical presentation position to be advanced to the next vertical tab stop. The horizontal position is not affected unless automatic carriage return mode is activated from the operator panel Configuration menu. If there are no tab stops past the current vertical presentation position, Vertical Tab is treated as a Line Feed.

Form Feed (FF)

0C

This control causes a new page to be started. Form Feed is a line end and page end control; it causes all deferred printing that may have been buffered for the current page to be completed and the form physically advanced to eject the current page. The vertical presentation position advances to the top margin and the horizontal presentation position is set to the left margin for subsequent printing.

Carriage Return (CR)

0D

This control moves the current horizontal print position to the left margin. If Carriage Return equals Carriage Return + Line Feed, a Line Feed is executed when Carriage Return is received. Otherwise, the vertical position does not change. Carriage Return is a line ending control code that causes buffered data to print.

Shift Out (SO) / Double-Wide Print

0E

This control causes the printer to start double-width printing. Double-width printing prints the characters twice as wide as the current character spacing. This results in half as many characters per inch. Each character takes up the space of two single-width characters. A Carriage Return, Line Feed, Form Feed, Vertical Tab, Double-Wide Continuous Mode, Cancel Double-Wide Print, or Set Presentation Position with vertical movement specified cancels the Shift Out control code.

Shift In (SI) / Condensed Print

0F

This control prints graphic characters in condensed pitch (15, 17.1, or 20 CPI). If the current print option is 10 CPI this control will condense printing to 17.1 CPI. If the current print option is 12 CPI this control will condense printing to 20 CPI. If the current print option is 15 CPI there is no change in density. This control changes the maximum number of characters that can be printed on one line. Shift In is a buffer terminating control; if printable data at a different character-per-inch setting is buffered, that data is printed before the setting is changed. The current presentation position becomes the next printable column at the new character-per-inch setting. CPI can be changed within a print line.

Device Control 1 (DC1) / Select

11

This control selects the printer.

Device Control 2 (DC2) / Cancel Condensed Print

12

This control cancels or ends condensed (17.1 or 20 CPI) printing. DC2 is a buffer terminating control; if printable data at a different characters-per-inch setting is buffered, that data is printed before the setting is changed. The current presentation position becomes the next printable column at the new character-per-inch setting. CPI can be changed within a print line.

Device Control 3 (DC3) / Deselect

13

This control is treated as a NUL.

Device Control 4 (DC4) / Cancel Double-Wide Print

14

This control cancels double-wide printing if double wide was selected with the Shift Out control. The characters-per-inch setting returns to the previous value.

Cancel (CAN)

18

This control purges all buffered data. All data received after the most recent buffer terminating control is discarded. For a list of buffer terminating controls, see “Buffer Terminating Conditions” on page 72. Any data received after Cancel is processed normally. Cancel does not change the current presentation position.

Space (SP)

20

This control moves the print position one character space to the right.

Delete Character (DEL)

7F

This control removes the last text character on the print line and does not affect control codes.

Escape Sequence Controls

Escape sequence controls have an ESC followed by one or more control parameters. Supported escape sequence controls are:

Control	Hex	Name
ESC	1B	Escape
ESC NUL	1B 00	Null (no operation)
ESC BEL	1B 07	Bell
ESC BS	1B 08	Backspace
ESC HT	1B 09	Horizontal Tab
ESC LF	1B 0A	Line Feed
ESC VT	1B 0B	Vertical Tab
ESC FF	1B 0C	Form Feed
ESC CR	1B 0D	Carriage Return
ESC SO	1B 0E	Shift Out (Double-Wide Print)
ESC SI	1B 0F	Shift In (Condensed Print)
ESC DC1	1B 11	Device Control 1 (Select)
ESC DC2	1B 12	Device Control 2 (Cancel Condensed Print)

Control	Hex	Name
ESC DC3	1B 13	Device Control 3 (Deselect)
ESC DC4	1B 14	Device Control 4 (Cancel Double-Wide Print)
ESC CAN	1B 18	Cancel
ESC EM	1B 19	Turn Auto Sheet Feed On or Off
ESC SP	1B 20	Set Intercharacter Spacing
ESC !	1B 21	Master Select
ESC #	1B 23	Cancel MSB Control
ESC \$	1B 24	Set Absolute Print Position
ESC %	1B 25	Select User-defined Set
ESC &	1B 26	Define User-defined Characters
ESC *	1B 2A	Select Graphics Mode
ESC -	1B 2D	Auto Underscore
ESC /	1B 2F	Select Vertical Tab Channel
ESC 0	1B 30	Set 1/8 Inch Line Spacing (8 LPI)
ESC 1	1B 31	Set 7/72 Inch Vertical Spacing
ESC 2	1B 32	Set 1/6 Inch Line Spacing (6 LPI)
ESC 3	1B 33	Set $n/216$ Inch Line Spacing
ESC 4	1B 34	Select Italic Mode
ESC 5	1B 35	Cancel Italic Mode
ESC 6	1B 36	Printable Code Area Expansion
ESC 7	1B 37	Cancel Printable Code Area Expansion
ESC : NUL	1B 3A 00	Copy ROM into RAM
ESC <	1B 3C	Set Unidirectional Mode (1 line only)
ESC =	1B 3D	Set MSB to 0
ESC >	1B 3E	Set MST to 1
ESC ?	1B 3F	Reassign Graphics Mode
ESC @	1B 40	Initialize Printer
ESC A	1B 41	Select $n/72$ Inch Line Spacing
ESC B	1B 42	Set Vertical Tabs
ESC C	1B 43	Set Page Length (Lines or Inches)
ESC D	1B 44	Set Horizontal Tabs
ESC E	1B 45	Begin Emphasized Print
ESC F	1B 46	End Emphasized Print
ESC G	1B 47	Begin Double-Strike Print
ESC H	1B 48	End Double-Strike Print
ESC I	1B 49	Printable Code Area Expansion
ESC J	1B 4A	Perform $n/216$ Inch Line Feed
ESC K	1B 4B	Select Single Density Graphics Mode
ESC L	1B 4C	Select Double Density Graphics Mode
ESC M	1B 4D	Select 12 CPI
ESC N	1B 4E	Begin Skip Perforation

Control	Hex	Name
ESC O	1B 4F	End Skip Perforation
ESC P	1B 50	Select 10 CPI
ESC Q	1B 51	Set Right Margin
ESC R	1B 52	Select Character Set
ESC S	1B 53	Begin Subscript/Superscript
ESC T	1B 54	End Subscript/Superscript
ESC U	1B 55	Set Print Direction
ESC W	1B 57	Double-Wide Continuous Mode
ESC Y	1B 59	Dual Density Bit Image Graphics Type 2
ESC Z	1B 5A	High Density Bit Image Graphics
ESC \	1B 5C	Set Relative Position
ESC a	1B 61	Set Letter Quality Justification
ESC b	1B 62	Set Vertical Tabs in Channel
ESC d	1B 64	Relative Move Right $n/120$
ESC e	1B 65	Relative Move Left $n/120$
ESC g	1B 67	Set 15 CPI
ESC j	1B 6A	Feed Paper $n/216$ Reverse
ESC k	1B 6B	Select NLQ Font
ESC l	1B 6C	Set Left Margin
ESC p	1B 70	Turn Proportional Mode On/Off
ESC s	1B 73	Quiet Printing
ESC t	1B 74	Select Character Table
ESC w	1B 77	Double High Printing
ESC x	1B 78	Select NLQ or DP Print Quality

Escape (ESC)

1B

This control is a prefix used in combination with supplementary control bytes to provide an extended set of control functions.

Null (ESC NUL)

1B	00
----	----

The printer ignores the NUL control by itself.

Bell (ESC BEL)

1B	07
----	----

This control causes the audible alarm to sound, if enabled. The alarm may be disabled or enabled from the Configuration menu.

Backspace (ESC BS)

1B	08
----	----

This control moves the print position horizontally one character width to the left. If the current print position is at the left margin, the printer ignores this command.

Horizontal Tab (ESC HT)

1B	09
----	----

This control moves the print position to the next horizontal tab stop. If there are no tab stops to the right, or if the next tab stop is beyond the current right margin, the control is ignored.

Line Feed (ESC LF)

1B	0A
----	----

This control advances the paper one line. The horizontal position does not change unless automatic carriage return mode is activated from the operator panel Configuration menu. If the paper advance crosses the bottom margin, the printer completes all deferred printing on the current page and then does an automatic form feed.

If skip perforation mode is active and the bottom margin is crossed, the vertical position on the new page following the automatic form feed will be the top-of-form position. If skip perforation is not active, the vertical position on the new page is the point immediately following the previous print line.

Vertical Tab (ESC VT)

1B	0B
----	----

This control causes the vertical presentation position to be advanced to the next vertical tab stop. The horizontal position is not affected unless automatic carriage return mode is activated from the operator panel Configuration menu. If there are no tab stops past the current vertical presentation position, Vertical Tab is treated as a Line Feed.

Form Feed (ESC FF)

1B	0C
----	----

This control causes a new page to be started. Form Feed is a line end and page end control; it causes all deferred printing that may have been buffered for the current page to be completed and the form physically advanced to eject the current page. The vertical presentation position advances to the top margin and the horizontal presentation position is set to the left margin for subsequent printing.

Carriage Return (ESC CR)

1B	0D
----	----

This control moves the current horizontal print position to the left margin. The vertical print position does not change unless automatic line feed mode is active.

Shift Out (ESC SO) / Double-Wide Print

1B	0E
----	----

This control causes the printer to start double-width printing. Double-width printing prints the characters twice as wide as the current character spacing. This results in half as many characters per inch. Each character takes up the space of two single-width characters. A Carriage Return, Line Feed, Form Feed, Vertical Tab, Double-Wide Continuous Mode, Cancel Double-Wide Print, or Set Presentation Position with vertical movement specified cancels the Shift Out control code.

Shift In (ESC SI) / Condensed Print

1B	0F
----	----

This control prints graphic characters in condensed pitch (15, 17.1, or 20 CPI). If the current print option is 10 CPI this control will condense printing to 17.1 CPI. If the current print option is 12 CPI this control will condense printing to 20 CPI. If the current print option is 15 CPI there is no change in density. This control changes the maximum number of characters that can be printed on one line. Shift In is a buffer terminating control; if printable data at a different character-per-inch setting is buffered, that data is printed before the setting is changed. The current presentation position becomes the next printable column at the new character-per-inch setting. CPI can be changed within a print line.

Device Control 1 (ESC DC1) / Select

1B	11
----	----

This control selects the printer.

Device Control 2 (ESC DC2) / Cancel Condensed Print

1B	12
----	----

This control cancels or ends condensed (17.1 or 20 CPI) printing. DC2 is a buffer terminating control; if printable data at a different characters-per-inch setting is buffered, that data is printed before the setting is changed. The current presentation position becomes the next printable column at the new character-per-inch setting. CPI can be changed within a print line.

Device Control 3 (ESC DC3) / Deselect

1B	13
----	----

This control is treated as a NUL.

Device Control 4 (ESC DC4) / Cancel Double-Wide Print

1B	14
----	----

This control cancels double-wide printing if double wide was selected with the Shift Out control. The characters-per-inch setting returns to the previous value.

Cancel (ESC CAN)

1B	18
----	----

This control purges all buffered data. All data received after the most recent buffer terminating control is discarded. For a list of buffer terminating controls, see “Buffer Terminating Conditions” on page 72. Any data received after Cancel is processed normally. Cancel does not change the current presentation position.

Set Intercharacter Spacing (ESC SP)

1B	20	NN
----	----	----

This control sets the amount of space to be added to the right of each character. The number of units of space is equal to NN, from 0 to 127. Each unit of space is 1/120th of an inch.

Master Select (ESC !)

1B	21	NN
----	----	----

This control selects any valid combination of the modes in the table below. To determine the value of the NN, add together the values of the modes you select from the table.

Mode	Decimal	Hex
10 CPI	0	00
12 CPI	1	01
Proportional	2	02
Condensed	4	04
Emphasized	8	08
Double-Strike	16	10
Double-Wide	32	20
Italic	64	40
Underline	128	80

This control applies to DP and NLQ. Proportional cannot be condensed and 10 CPI cannot be combined with 12 CPI. Proportional overrides condensed if both proportional and condensed are selected. Double-strike is ignored in NLQ.

Cancel MSB Control (ESC #)

1B	23
----	----

Cancels the most significant bit (MSB) control.

Set Absolute Print Position (ESC \$)

1B	24	N1	N2
----	----	----	----

This control specifies the distance that subsequent characters are to be printed from the set left margin in 1/60 inch units. Where the total number of dots equals $N1 + (N2 \times 256)$. If the position is beyond the right margin, the control is ignored and the previous setting remains active. If the position is within the right margin, subsequent characters will be printed at $(N1 + [N2 \times 256])/60$ inches.

Select User-Defined Set (ESC %)

1B	25	NN	00
----	----	----	----

This control specifies the character set as default or user-defined. The following are the values of NN:

- 0 Selects the default character set.
- 1 Selects the user-defined character set.

Define User-Defined Characters (ESC &)

1B	26	NN	MM	W0	W1	W2	D0...DN
----	----	----	----	----	----	----	---------

This control allows the definition of special characters that are not present in the character sets.

NN and MM are two decimal numbers that define the first and last characters to be replaced in the character set in use. If you want to replace only one character, MM must be equal to NN. Any value in the range of 0 to 127 is accepted, even code 32, which is the space character.

W0, W1, and W2 are numbers that specify the width of the character and the space around it. The space on the left of the character (in columns of dots) is specified by W0; the space on the right of the character is specified by W2. W1 specifies the number of columns of dots that must be printed to design the character.

The following table lists the maximum value for W0, W1, and W2:

Printing	W0 + W1	W0 + W1 + W2
DP	9	12
NLQ at 10 CPI	35	36
NLQ at 12 CPI	29	30
Proportional	41	42

D0...DN is the data of the character that is printed. Three bytes are needed for each column because it is composed of 24 dot positions. In this way, the number of data bytes is $W1 \times 3$. You can define a character in superscript or subscript. Two bytes are needed for each column because it is composed of 16 dot positions. The number of data bytes is $W1 \times 2$.

Select Graphics Mode (ESC *)

1B	2A	MM	N1	N2
----	----	----	----	----

This control selects the graphics mode MM from the table below. The total number of columns equals N1 + (N2 × 256).

Option	Alternate Code	MM	Horizontal Density (dots/in.)
Single-Density	ESC K	0	60
Double-Density	ESC L	1	120
High-Speed Double-Density *	ESC Y	2	120
Quadruple-Density *	ESC Z	3	240
CRT I	NONE	4	80
Plotter (1:1)	NONE	5	72
CRT II	NONE	6	90
Double-Density Plotter	NONE	7	144

Note: (*) Adjacent dots cannot be printed in this mode

Auto Underscore (ESC –)

1B	2D	NN
----	----	----

This control turns on and off the continuous underscore function.

If NN is an odd value (1, 3, 5 ...), the printer underscores all text characters and spaces following this sequence. The printer does not underscore white space caused by horizontal tabs.

If NN is an even value (0,2,4,...), the printers stops the underscore of all data following this sequence.

Select Vertical Tab Channel (ESC /)

1B	2F	CH
----	----	----

This control selects the vertical tab channel. The values for CH are 0 to 7. The channel selected by this control is used for all subsequent vertical tab commands. Channel 0 is used if no channel has been selected.

Set 1/8 Inch Line Spacing (ESC 0)

1B	30
----	----

This control sets the line spacing to eight lines per inch.

The application program is responsible for keeping track of the vertical position on the current page relative to the current line spacing. Changing the line spacing within a print job without changing the page length can cause printing on the page perforation. For additional information, see “Set Page Length (ESC C)” on page 55.

Set 7/72 Inch Line Spacing (ESC 1)

1B	31
----	----

This control sets the line spacing to 7/72 inch.

The application program is responsible for keeping track of the vertical position on the current page relative to the current line spacing. Changing the line spacing within a print job without changing the page length can cause printing on the page perforation. For additional information, see “Set Page Length (ESC C)” on page 55.

Set 1/6 Inch Line Spacing (ESC 2)

1B	32
----	----

This control sets the line spacing at the value set by the last Set Text Line Spacing (ESC A) control received. The printer sets the line spacing to six lines per inch if no ESC A has been issued.

Set $n/216$ Inch Line Spacing (ESC 3)

1B	33	NN
----	----	----

This control changes the line spacing to the value specified by NN.

NN is a value that specifies the line spacing in units of 1/216 inch. Valid values are 0 to 255. If NN equals 0, the printer ignores this control.

The application program is responsible for keeping track of the vertical position on the current page relative to the current line spacing. Changing the line spacing within a print job without changing the page length can cause printing on the page perforation. For additional information, see “Set Page Length (ESC C)” on page 55.

Select Italic Mode (ESC 4)

1B	34
----	----

This control turns on italic character printing. This control is valid even if the Epson Extended Graphics character set has been selected by the Character Table (ESC t) or the operator panel, but character graphics cannot be italicized. This control is used in both DP and NLQ.

Cancel Italic Mode (ESC 5)

1B	35	NN
----	----	----

This control cancels italic character printing.

Printable Code Area Expansion (ESC 6)

1B	36
----	----

This control enables codes X'80' through X'9F' from the active character set to become printable characters instead of control characters.

Cancel Printable Code Area Expansion (ESC 7)

1B	37
----	----

This control cancels Printable Code Area Expansion (ESC 6).

Copy ROM into Ram (ESC : NUL)

1B	3A	00
----	----	----

This control copies the characters in ROM into RAM. Specific characters may be redefined.

Select Unidirectional Mode (one line only) (ESC <)

1B	3C
----	----

This control selects unidirectional printing from left to right for one line only. ESC < is cancelled by a Carriage Return. The print head begins the line at the Home position, prints to the end of the line, then is cancelled by the CR that returns the head to Home.

Set MSB to 0 (ESC =)

1B	3D
----	----

This control sets the most significant bit (MSB) of all incoming data to 0. The MSB is bit 7. This control only affects text and control code data. This control can prevent the problem of some system applications that always send data with the MSB set to 1, which results in italic or graphics printing in Epson printers.

Set MSB to 1 (ESC >)

1B	3E
----	----

This control sets the most significant bit (MSB) of all incoming data to 1. The MSB is 7. This control only affects text and control code data.

Reassign Graphics Mode (ESC ?)

1B	3F	S	NN
----	----	---	----

This control reassigns a graphics command (ESC K, ESC L, ESC Y, or ESC Z) to a different mode (K, L, Y, or Z).

Option	Alternate Code	NN	Horizontal Density (dots/in.)
Single-Density	ESC K	0	60
Double-Density	ESC L	1	120
High-Speed Double-Density *	ESC Y	2	120
Quadruple-Density *	ESC Z	3	240
CRT I	NONE	4	80
Plotter (1:1)	NONE	5	72
CRT II	NONE	6	90
Double-Density Plotter	NONE	7	144

Note: (*) Adjacent dots cannot be printed in this mode.

Initialize Printer (ESC @)

1B	40
----	----

This control resets all print related parameters to values previously saved and clears the buffer of printable data.

Select $n/72$ Inch Line Spacing (ESC A)

1B	41	NN
----	----	----

This control sets a line spacing value for subsequent line feeds.

NN is a one-byte hexadecimal number that specifies the line spacing value of $NN/72$ inches.

The value of NN is 0 to 85. Following are example values for NN:

X'18' 3 LPI
 X'12' 4 LPI
 X'0C' 6 LPI
 X'09' 8 LPI
 X'08' 9 LPI
 X'06' 12 LPI

Set Vertical Tabs (ESC B)

1B	42	N1	N2...00
----	----	----	---------

This control sets the vertical stops. The maximum number of tab stops supported is 16. The settings are not affected by subsequent changes in line spacing. The tab settings must be in ascending order (N1, N2, etc.) with the 0 character indicating the end of the command. Values of N are 1 to 255. All settings are stored in Channel 0. See “Select Vertical Tabs in Channels (ESC b)” on page 60. To clear the tab settings, use ESC B 0.

Set Page Length (ESC C)

1B	43	LL	IN
----	----	----	----

This control sets the physical page length in lines or inches and resets skip perforation mode.

LL is a one-byte hexadecimal number that specifies the page length in lines. The value is converted to inches based upon the current line spacing. Valid values for LL are X'01' to X'FF', but the resulting page length in inches must be less than 113.8 inches (2890 mm). If LL equals 0, then parameter II (length in inches) is used.

IN is a one-byte hexadecimal number that specifies the page length in inches. IN is present only if parameter LL equals 0. Valid values for IN are X'01' to X'71'. If IN is greater than the maximum value, the maximum value is used. If both LL and IN are zero, the control is ignored.

Set Horizontal Tabs (ESC D)

1B	44	TT...TT	00
----	----	---------	----

This control sets the horizontal tab stops. The maximum number of tab stops supported is 32. The sequence terminates with the NUL control code. If the null terminator is missing, the printer treats the next 32 bytes as tab stops and ignores all the data bytes following the 32 bytes until a Null is received. If the printer receives this control code with no tabs, all horizontal tab stops are cleared.

TT is the list of tab stops as character positions relative to the left edge of the physical page. Valid values are X'01' to X'FF'. Tab stops must be specified in ascending order. Entries not in ascending order are ignored.

Begin Emphasized Print (ESC E)

1B	45
----	----

This control starts emphasized print mode (bold style). Emphasized printing continues until the printer receives an End Emphasized Print (ESC F) control or the printer is initialized.

End Emphasized Print (ESC F)

1B	46
----	----

This control ends emphasized print mode (bold style).

Begin Double-Strike Print (ESC G)

1B	47
----	----

This control starts double-strike printing (all text characters are double struck). Double-strike printing continues until the printer receives an End Double-Strike Print control (ESC H) or the printer is initialized.

End Double-Strike Print (ESC H)

1B	48
----	----

This control ends double-strike printing.

Printable Code Area Expansion (ESC I)

1B	49
----	----

This control defines whether codes X'00' through X'1F' and codes X'80' through X'9F' are printable characters or control characters of the active character set.

When NN equals X'01', the codes become printable characters, which allows them to be used as user-defined characters.

When NN equals X'00', the codes are returned to nonprintable characters.

Perform $n/216$ Inch Line Feed (ESC J)

1B	4A	NN
----	----	----

This control performs a vertical move relative to the current presentation position.

NN is a one-byte hexadecimal value that specifies the move amount in units of 1/216 inch. The printer will adjust the value to the nearest 1/144 inch. This control performs an immediate line feed, but does not affect subsequent line spacing and does not produce a CR.

Select Single Density Graphics Mode (ESC K)

1B	4B	LL	HH	NN...NN
----	----	----	----	---------

This control prints the supplied bit image data at 60 horizontal pel by 72 vertical pel. Bit image data can be mixed with text data on the same line.

A two-byte count (LL HH) indicates the number of bytes that follow in this control. LL is the least significant byte of the count; HH is the most significant byte. (The number of bytes that follow should equal $HH \times 256 + LL$.) If the count equals X'0000', the control is ignored.

NN...NN are the bytes containing the bit image data. The data format is in 8-bit vertical slices, with the least significant bit the bottom dot and the most significant bit the top dot. B'1' indicates a pel to be printed; B'0' indicates an unprinted pel. Data that exceeds the right margin is discarded.

Select Double Density Graphics Mode (ESC L)

1B	4C	LL	HH	NN...NN
----	----	----	----	---------

This control prints the supplied bit image data at 120 horizontal by 72 vertical pel. Bit image data can be mixed with text data on the same line.

A two-byte count (LL HH) indicates the number of bytes that follow in this control. LL is the least significant byte of the count; HH is the most significant byte. (The number of bytes that follow should equal $HH \times 256 + LL$.) If the count equals X'0000', the control is ignored.

NN .. NN are the bytes containing the bit image data. The data format is in 8-bit vertical slices, with the least significant bit the bottom dot and the most significant bit the top dot. B'1' indicates a pel to be printed; B'0' indicates an unprinted pel. Data that exceeds the right margin is discarded.

Select 12 CPI (ESC M)

1B	4D
----	----

This control selects 12 characters per inch printing.

Begin Skip Perforation (ESC N)

1B	4E	NN
----	----	----

This control sets the number of lines to be skipped at the bottom of each page. Once this function is activated, it stays active until the End Skip Perforation (ESC O) or Set Page Length (ESC C) control is received or the printer is initialized.

NN is a one-byte hexadecimal value that specifies the number of lines to skip at the bottom of each page. This value must be greater than zero and less than the length of the page in lines (from 0 to 127). If the value is not valid, the control is ignored. Once Begin Skip Perforation is activated, the number of lines that may be printed on a page is the page length minus NN.

End Skip Perforation (ESC O)

1B	4F
----	----

This control ends skip perforation.

Select 10 CPI (ESC P)

1B	50
----	----

This control selects 10 CPI printing and is normally used to cancel 12 CPI.

Select Right Margin (ESC Q)

1B	51	NN
----	----	----

This control sets the right margin to N columns at the current character width. Where NN is the number of columns from the first print position to the end of the print line.

Select Character Set (ESC R)

1B	52	NN
----	----	----

This control specifies an international character set as shown in the table below and is available in both DP and NLQ. The following values for NN are:

N	Character Set	Hex Codes											
		23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0	USA	#	\$	@	[	\	\]	^	'	{	|	}	-
1	France	#	\$	à	°	ç	§	^	'	é	ù	è	..
2	Germany	#	\$	§	Ä	Ö	Ü	^	'	ä	ö	ü	ß
3	United Kingdom	£	\$	@	[	\	\]	^	'	{	|	}	-
4	Denmark I	#	\$	@	Æ	Ø	Å	^	'	æ	ø	å	-
5	Sweden	#	□	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy	#	\$	@	°	\	é	^	ù	à	ò	è	ì
7	Spain I	Pl	\$	@	ı	Ñ	ı	^	'	..	ñ	}	-
8	Japan	#	\$	@	[	¥	]	^	'	{	|	}	-
9	Norway	#	□	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
A	Denmark II	#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
B	Spain II	#	\$	á	ı	Ñ	ı	é	'	í	ñ	ó	ú
C	Latin America I	#	\$	á	ı	Ñ	ı	é	ü	í	ñ	ó	ú
D	French Canadian	#	\$	à	â	ç	ê	î	ô	é	ù	è	û
E	Latin America II	#	\$	@	[	Ñ	]	ú	í	ó	á	é	ü

Begin Subscript/Superscript (ESC S)

1B	53	NN
----	----	----

This control activates subscript and superscript printing. Once this printing is active, it stays active until another Begin Subscript/Superscript control changes the mode, an End Subscript/Superscript control is received, or the printer is initialized.

NN is a one-byte hexadecimal value that activates subscript or superscript printing.

- If NN is an odd value (1, 3, 5, ...), subscript mode is active.
- If NN is an even value (0, 2, 4, ...), superscript mode is active.

End Subscript/Superscript (ESC T)

1B	54
----	----

This controls stops subscript and superscript printing.

Set Print Direction (ESC U)

1B	55	NN
----	----	----

This control specifies bidirectional or unidirectional printing.

- If NN is an odd value (1, 3, 5, ...) unidirectional printing is selected.
- If NN is an even value (0, 2, 4, ...), bidirectional printing (default) is selected.

Double-Wide Continuous Mode (ESC W)

1B	57	NN
----	----	----

This control turns double-wide printing on or off. When double-wide printing is on, the width of subsequent graphic characters is doubled (the characters per inch value is half of the single character value). For tabs, the font width is not doubled (tab distance is based upon single character width).

NN is a one-byte hexadecimal value that turns double-wide printing on or off.

- If NN is an odd value (1, 3, 5, ...), double-wide printing is turned on.
- If NN is an even value (0, 2, 4, ...), double-wide printing is turned off.

Note: Double-Wide Continuous Mode does the same function as Shift Out, except double wide printing is not canceled when a new line begins.

Dual Density Bit Image Graphics Type 2 (ESC Y)

1B	59	LL	HH	NN...NN
----	----	----	----	---------

This control prints the supplied bit image data at 120 horizontal pel by 72 vertical pel. Bit image data can be mixed with text data on the same line. Horizontally adjacent dots are not allowed and will be removed if specified.

A two-byte count (LL HH) indicates the number of bytes that follow in this control. LL is the least significant byte of the count; HH is the most significant byte. (The number of bytes that follow should equal $HH \times 256 + LL$.) If the count equals X'0000', the control is ignored.

NN...NN are the bytes containing the bit image data. The data format is in 8-bit vertical slices, with the least significant bit the bottom dot and the most significant bit the top dot. B'1' indicates a pel to be printed; B'0' indicates an unprinted pel. Data that exceeds the right margin is discarded.

High Density Bit Image Graphics (ESC Z)

1B	5A	LL	HH	NN...NN
----	----	----	----	---------

This control prints the supplied bit image data at 240 horizontal per by 72 vertical pel. Bit image data can be mixed with text data on the same line.

A two-byte count (LL HH) indicates the number of bytes that follow in this control. LL is the least significant byte of the count; HH is the most significant byte. (The number of bytes that follow should equal $HH \times 256 + LL$.) If the count equals X'0000', the control is ignored.

NN...NN are the bytes containing the bit image data. The data format is in 8-bit vertical slices, with the least significant bit the bottom dot and the most significant bit the top dot. B'1' indicates a pel to be printed; B'0' indicates an unprinted pel. Data that exceeds the right margin is discarded.

Set Relative Position (ESC \)

1B	5C	N1	N2
----	----	----	----

This control moves the print head to a horizontal print position relative to the current print position using 1/120 inch increments. To calculate the correct values for N1 and N2, determine the displacement required in 1/120 of an inch. Send the resulting number using the formula total number of dots equals $N1 + (N2 \times 256)$. If the desired formula is to the left, subtract the number from 65536 before using the formula. The print head will move $(N1 + [N2 \times 256])/120$ inches relative to the current print position. The control is ignored if it would move the print head beyond the page margins.

Set Letter Quality Justification (ESC a)

1B	61	NN
----	----	----

This control selects print justification according to the following values of NN:

- 0 Selects left justification
- 1 Selects center justification
- 2 Selects right justification
- 3 Selects full justification

Notes:

1. Left justification is the default setting (NN = 0).
2. The commands HT and BS are valid only when left justification is active.
3. For full justification, there must be no carriage returns within a paragraph.

Select Vertical Tabs in Channels (ESC b)

1B	62	CH	N1	N2...00
----	----	----	----	---------

This control sets vertical tabs to channels selected by the Set Vertical Tab Channel (ESC /) control. The value of CH is 0 through 7 and the value of N1 is 0 through 255.

The distance of each tab stop from top of form is the current line spacing times the number of lines given in N1.

If paper movement is commanded to a value of N1 greater than the page length, the paper movement command is ignored. The values of N1 must be in ascending order. If they are not, the sequence up to and including the out of sequence number is ignored. Skip over perforation is ignored. You can clear any channel by sending ESC b CH 0, where CH is the channel number.

Relative Move Right n/120 (ESC d)

1B	64	N1	N2
----	----	----	----

This control spaces forward in 1/120s of an inch. To find the values for N1 and N2, determine the required displacement in 1/120s of an inch. Send the resulting number in the formula: $N1 + (N2 \times 256)$.

Relative Move Left n/120 (ESC e)

1B	65	N1	N2
----	----	----	----

This control spaces backward in 1/120s of an inch. To find the values for N1 and N2, determine the required displacement in 1/120s of an inch. Send the resulting number in the formula: N1 + (N2 X 256).

Set 15 CPI (ESC g)

1B	67
----	----

This control prints any data stored in the print buffer, and initializes following text to print at 15 CPI.

Feed Paper *n*/216 Reverse (ESC j)

1B	6A
----	----

This command causes fanfold paper to feed backwards *n*/216 of an inch.

Select NLQ Font (ESC k)

1B	6B	NN
----	----	----

This control selects an NLQ font based on the following values of NN:

0 Courier
1 Gothic

This control affects only NLQ.

Set Left Margin (ESC l)

1B	6C	NN
----	----	----

This control sets the left margin to NN columns from the left edge of the physical page to the beginning of the print line. Where NN is a hex value. The number of inches in the margin does not vary if the font, character width, or horizontal dot density changes. This command automatically clears and resets horizontal tabs to every eight characters, then performs a cancel operation. The smallest possible space between the left margins is the width of one double-wide, 10 CPI character. If a margin control code violates this minimum distance, it is ignored. Settings in proportional mode are treated as 10 CPI.

Turn Proportional Mode On/Off (ESC p)

1B	70	NN
----	----	----

This control sets proportional mode on or off to the following values of NN:

0 Mode is Off
1 Mode is On

This control overrides condensed and is available for DP, NLQ, and user-defined characters.

Quiet Printing (ESC s)

1B	73	NN
----	----	----

This control activates and deactivates Quiet Mode (half-speed printing). The following are the values for NN:

- 0 Set Quiet Mode Off
- 1 Set Quiet Mode On

Select Character Table (ESC t)

1B	74	NN
----	----	----

This control selects italic characters from the Epson Italic character set. The characters selected are ASCII codes 128 to 255 (X'80' through X'FF').

The following values of NN are:

- X'0' Select Epson Italic character set
- X'1' Selects Epson Extended Graphics Italic character set (actually Code Page 437)
- X'2' Remap DLL character set from positions 0 - 127 to 128 - 255.

Selecting Epson Extended Graphics does not disable italic printing. The value of NN must equal X'00' or X'01'.

Double High Printing (ESC w)

1B	77	NN
----	----	----

This control activates and deactivates double-high printing. The following are the values for NN:

- 0 Set Double-High Mode Off
- 1 Set Double-High Mode On

Superscript, subscript, and condensed modes are not valid in double-high mode. This command is available for both DP and NLQ printing.

Select NLQ or DP Print Quality (ESC x)

1B	78	NN
----	----	----

This control selects NLQ or DP from the following values of NN:

- 0 Selects Fast Draft or DP mode. (See Note).
- 1 Selects NLQ mode

Notes: If the printer configuration 'Host Fast Draft' setting is enabled then Fast Draft quality is selected. If 'Host Fast Draft' is disabled then DP quality is selected (model Z03 only).

4247 Commands

Control	Hex	Name
DC4 DC4 ESC ! NN 1 PP EM	14 14 1B 21 01	Select EAN-8 Bar Code
DC4 DC4 ESC ! NN 2 PP EM	14 14 1B 21 02	Select EAN-13 Bar Code
DC4 DC4 ESC ! NN 3 PP EM	14 14 1B 21 03	Select UPC-A Bar Code
DC4 DC4 ESC ! NN 4 PP EM	14 14 1B 21 04	Select MSI Bar Code
DC4 DC4 ESC ! NN 5 PP EM	14 14 1B 21 05	Select UPC-E Bar Code

Control	Hex	Name
DC4 DC4 ESC ! NN 6 PP EM	14 14 1B 21 06	Select UPC 2-Digit Bar Code (Magazine)
DC4 DC4 ESC ! NN 7 PP EM	14 14 1B 21 07	Select UPC 5-Digit Bar Code (Magazine)
DC4 DC4 ESC ! NN 17 PP EM	14 14 1B 21 11	Select 2 of 5 INTERLEAVED Bar Code
DC4 DC4 ESC ! NN 18 PP EM	14 14 1B 21 12	Select 2 of 5 INDUSTRIAL Bar Code
DC4 DC4 ESC ! NN 19 PP EM	14 14 1B 21 13	Select 2 of 5 MATRIX Bar Code
DC4 DC4 ESC ! NN 20 PP EM	14 14 1B 21 14	Select CODE 3 of 9 Bar Code
DC4 DC4 ESC ! NN 22 PP EM	14 14 1B 21 16	Select CODABAR Bar Code
DC4 DC4 ESC ! NN 23 PP EM	14 14 1B 21 17	Select CODE 128 Bar Code
DC4 DC4 ESC ! NN 24 PP EM	14 14 1B 21 18	Select POSTNET Bar Code
DC4 DC4 ESC (GS {N1} {DATA1} {N2} {DATA2} EM	14 14 1B 28 1D DD..DD 1D DD..DD 19	Print Bar Code Selection
DC4 DC4 ESC @	14 14 1B 40	Reinitialize Printer
DC4 DC4 ESC 1 NN	14 14 1B 31	Set Vertical Spacing $n/144$ Inch
DC4 DC4 ESC 3 1	14 14 1B 33 31	Set Vertical Spacing to 12 Lines/30mm
DC4 DC4 ESC 3 3	14 14 1B 33 33	Set Vertical Spacing to 3 Lines/30mm
DC4 DC4 ESC 3 4	14 14 1B 33 34	Set Vertical Spacing to 4 Lines/30mm
DC4 DC4 ESC 3 6	14 14 1B 33 36	Set Vertical Spacing to 6 Lines/30mm
DC4 DC4 ESC 3 8	14 14 1B 33 38	Set Vertical Spacing to 8 Lines/30mm
DC4 DC4 ESC 5	14 14 1B 35	Eject Single Sheet or Form Feed
DC4 DC4 ESC A	14 14 1B 41	Set 15, 17.1, or 20 CPI
DC4 DC4 ESC N	14 14 1B 4E	Load or Park Fanfold from a Rear Path
DC4 DC4 ESC T	14 14 1B 54	Load or Park Fanfold from a Front Path
DC4 DC4 ESC Y	14 14 1B 59	Select Emulation
DC4 DC4 ESC Z	14 14 1B 5A	Select AFTA in Column
DC4 DC4 ESC g	14 14 1B 67	Select Resident Font
DC4 DC4 ESC h	14 14 1B 68	Request to Read Configuration
DC4 DC4 ESC h	14 14 1B 68	Printer Configuration Response
DC4 DC4 ESC i	14 14 1B 69	Write Configuration Response
DC4 DC4 ESC i	14 14 1B 69	Write Configuration Acknowledgement
DC4 DC4 ESC p	14 14 1B 70	Select Print Quality

Select EAN-8 Bar Code (DC4 DC4 ESC ! NN 1 PP EM)

14	14	1B	21	NN	01	PP	19
----	----	----	----	----	----	----	----

This control selects the EAN-8 bar code.

The DATA field must contain only ASCII numeric (0 to 9) data, and must be eight bytes long, check digit included.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

00 Do not print human readable characters
01 Print human readable characters

Select EAN-13 Bar Code (DC4 DC4 ESC ! NN 2 PP EM)

14	14	1B	21	NN	02	PP	19
----	----	----	----	----	----	----	----

The control selects the EAN-13 bar code.

The DATA field must contain only ASCII numeric (0 to 9) data, and must be thirteen bytes long, check digit included.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

00 Do not print human readable characters
01 Print human readable characters

Select UPC-A Bar Code (DC4 DC4 ESC ! NN 3 PP EM)

14	14	1B	21	NN	03	PP	19
----	----	----	----	----	----	----	----

The control selects the UPC-A bar code.

The DATA field must contain only ASCII numeric (0 to 9) data, and must be twelve bytes long, including a system digit at the leftmost position and a check digit at the rightmost position of the data field.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

00 Do not print human readable characters
01 Print human readable characters

Select MSI Bar Code (DC4 DC4 ESC ! NN 4 PP EM)

14	14	1B	21	NN	04	PP	19
----	----	----	----	----	----	----	----

The control selects the MSI bar code.

The DATA field for this bar code does not have a defined length, but the DATA field must contain only ASCII numeric (0 to 9) data.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

- 00 Do not print human readable characters
- 01 Print human readable characters

Select UPC-E Bar Code (DC4 DC4 ESC ! NN 5 PP EM)

14	14	1B	21	NN	05	PP	19
----	----	----	----	----	----	----	----

The control selects the UPC-E bar code.

The DATA field must contain only ASCII numeric (0 to 9) data, and must be eight bytes long, including a system digit at the leftmost position and a check digit at the rightmost position of the data field. The system digit must be a 0 or 1.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

- 00 Do not print human readable characters
- 01 Print human readable characters

Select UPC 2-Digit Bar Code (Magazine) (DC4 DC4 ESC ! NN 6 PP EM)

14	14	1B	21	NN	06	PP	19
----	----	----	----	----	----	----	----

This control selects the UPC 2-Digit bar code.

The DATA field must contain only ASCII numeric (0 to 9) data, and must be three bytes long, check digit included.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

- 00 Do not print human readable characters
- 01 Print human readable characters

Select UPC 5-Digit Bar Code (Magazine) (DC4 DC4 ESC ! NN 7 PP EM)

14	14	1B	21	NN	07	PP	19
----	----	----	----	----	----	----	----

This control selects the UPC 5-Digit bar code.

The DATA field must contain only ASCII numeric (0 to 9) data, and must be six bytes long, check digit included.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

- 00 Do not print human readable characters
- 01 Print human readable characters

Select 2 of 5 INTERLEAVED Bar Code (DC4 DC4 ESC ! NN 17 PP EM)

14	14	1B	21	NN	11	PP	19
----	----	----	----	----	----	----	----

The control selects the 2 of 5 Interleaved bar code.

The DATA field for this bar code does not have a defined length, but the number of data bytes must be even. The DATA field must contain only ASCII numeric (0 to 9) data.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

- 00 Do not print human readable characters
- 01 Print human readable characters

Select 2 of 5 INDUSTRIAL Bar Code (DC4 DC4 ESC ! NN 18 PP EM)

14	14	1B	21	NN	12	PP	19
----	----	----	----	----	----	----	----

The control selects the 2 of 5 Industrial bar code.

The DATA field for this bar code does not have a defined length, but the DATA field must contain only ASCII numeric (0 to 9) data.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

- 00 Do not print human readable characters
- 01 Print human readable characters

Select 2 of 5 MATRIX Bar Code (DC4 DC4 ESC ! NN 19 PP EM)

14	14	1B	21	NN	13	PP	19
----	----	----	----	----	----	----	----

The control selects the 2 of 5 Matrix bar code.

The DATA field for this bar code does not have a defined length, but the DATA field must contain only ASCII numeric (0 to 9) data.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

- 00 Do not print human readable characters
- 01 Print human readable characters

Select CODE 3 of 9 Bar Code (DC4 DC4 ESC ! NN 20 PP EM)

14	14	1B	21	NN	14	PP	19
----	----	----	----	----	----	----	----

This control selects the Code 3 of 9 bar code.

The DATA field for this bar code does not have a defined length, but must start and end with an *.

The DATA field may contain alphanumeric data as follows:

0 1 2 3 4 5 6 7 8 9
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
 Space - . \$ / + %
 * (as start/stop character)

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

- 00 Do not print human readable characters
- 01 Print human readable characters

Select CODABAR Bar Code (DC4 DC4 ESC ! NN 22 PP EM)

14	14	1B	21	NN	16	PP	19
----	----	----	----	----	----	----	----

This control selects the Codabar bar code.

The DATA field for this bar code does not have a defined length, and must contain only the data characters listed below. Any combination of start/stop characters is allowed.

0 1 2 3 4 5 6 7 8 9 - \$: / . +
 A B C D E N T * a b c d e n t (as start/stop characters)

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

- 00 Do not print human readable characters
- 01 Print human readable characters

Select CODE 128 Bar Code (DC4 DC4 ESC ! NN 23 PP EM)

14	14	1B	21	NN	17	PP	19
----	----	----	----	----	----	----	----

This control selects the Code 128 bar code.

The DATA field for this bar code does not have a defined length, and must contain only the data characters belonging to the selected ASCII character set, including control characters.

Since GS and EM are control codes, the host application must set the high-order bit of the control code to allow the printer to distinguish between encodable data and terminator strings.

Human Readable Characters will be centered below the bar code and can be wider than the encoded area. The user is responsible for allowing space for Human Readable Characters to print without overlapping adjacent data.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

00 Do not print human readable characters
01 Print human readable characters

Select POSTNET Bar Code (DC4 DC4 ESC ! NN 24 PP EM)

14	14	1B	21	NN	18	PP	19
----	----	----	----	----	----	----	----

This control selects the POSTNET [ZIP, ZIP+4, or Delivery Point Bar Code (DPBC)] bar code.

The DATA field for this bar code must contain only ASCII numeric (0 to 9) data. A data string of all zeroes will be encoded if other than numeric data is detected in the job stream.

POSTNET bar code does not print Human Readable Characters, regardless of the PP byte. POSTNET uses the tall and short bars required by the United States Postal Service standard, and encodes numeric data streams regardless of length.

NN is a one-byte hexadecimal number that specifies the height of the bar code symbol as 1 to 12 (1/6 to 12/6 inch, or 2 inches).

PP is a one-byte hexadecimal number that specifies whether or not to print the bar code in Human Readable Characters as follows:

00 Do not print human readable characters
01 Print human readable characters

Print Bar Code Selection (DC4 DC4 ESC (GS {N1} {DATA1} GS {N2} {DATA2} EM)

14	14	1B	28	1D	DD...DD	1D	DD...DD	19
----	----	----	----	----	---------	----	---------	----

This sequence causes the bar code symbol to be printed according to the Bar Code Selection command. Sequential bar codes of the same type and height may be printed. GS N# defines the distance from the beginning of the line or between two bar code symbols in multiples of 1/72 of an inch. This command must be closed with an EM character.

Note: Bar code symbols will print over any descenders in the previous character box if any text is present.

Example 1:

Print an EAN-8 bar code symbol, one inch from the right margin with the data set of 12345678.

ASCII: DC4 DC4 ESC (GS 72 12345678 EM
 HEX: 14 14 1B 28 1D 48 31 32 33 34 35 36 37 38 19

Example 2:

Print two Code 3 of 9 bar code symbols. The first symbol on the right margin; the second symbol one inch to the right of the first symbol. Data sets are ABC+0123 and 12345678

ASCII: DC4 DC4 ESC (GS 0 *ABC+123* GS 72 *1234* EM
 HEX: 14 14 1B 28 1D 00 2A 41 42 43 2B 31 32 33 2A
 1D 48 2A 31 32 33 34 2A 19

Reinitialize Printer (DC4 DC4 ESC @)

14	14	1B	40
----	----	----	----

This command reinitializes the printer. It resets the printer mode and clears the buffer of printable data.

Set Vertical Spacing n/144 Inch (DC4 DC4 ESC 1 NN)

14	14	1B	31	NN
----	----	----	----	----

This control sets a line spacing value for subsequent line feeds.

NN is a one-byte hexadecimal number that specifies the line spacing value of NN/144 inches. The value of NN is 1 to 255.

Set Vertical Spacing 12 Lines/30mm (DC4 DC4 ESC 3 1)

14	14	1B	33	31
----	----	----	----	----

This command sets line spacing to 12 lines per 30 mm.

Set Vertical Spacing 3 Lines/30mm (DC4 DC4 ESC 3 3)

14	14	1B	33	33
----	----	----	----	----

This command sets line spacing to 3 lines per 30 mm.

Set Vertical Spacing 4 Lines/30mm (DC4 DC4 ESC 3 4)

14	14	1B	33	34
----	----	----	----	----

This command sets line spacing to 4 lines per 30 mm.

Set Vertical Spacing 6 Lines/30mm (DC4 DC4 ESC 3 6)

14	14	1B	33	36
----	----	----	----	----

This command sets line spacing to 6 lines per 30 mm.

Set Vertical Spacing 8 Lines/30mm (DC4 DC4 ESC 3 8)

14	14	1B	33	38
----	----	----	----	----

This command sets line spacing to 8 lines per 30 mm.

Eject Single Sheet or Form Feed (DC4 DC4 ESC 5)

14	14	1B	35
----	----	----	----

This command causes a form feed on fanfold forms.

Set 15, 17.1, 20 CPI (DC4 DC4 ESC A)

14	14	1B	41	NN
----	----	----	----	----

This command sets horizontal spacing (characters per inch) to 15, 17.1 or 20.

The values for NN are:

4	15 CPI
5	17.1 CPI
6	20 CPI

Load or Park Fanfold from a Rear Path (DC4 DC4 ESC N)

14	14	1B	4E	NN
----	----	----	----	----

This command loads or performs the Park function for fanfold paper fed from the rear path.

The values for NN are:

- 0 The printer selects the rear path. If paper fanfold is already loaded in a paper path that is not requested, the printer automatically performs the Park function before loading the rear path. The printer will then load the fanfold paper once data is received. For more information on the Park function, see "PARK/PATH" in "Chapter 2. Understanding the Operator Panel" in the *User's Guide* for your printer.
- 1 The printer performs the Park function for forms in the rear path.

Load or Park Fanfold from a Front Path (DC4 DC4 ESC T)

14	14	1B	54	NN
----	----	----	----	----

This command loads or performs the Park function for fanfold paper fed from the front path.

The values for NN are:

- 0 The printer selects the front path. If paper fanfold is already loaded in a paper path that is not requested, the printer automatically performs the Park function before loading the front path. The printer will then load the fanfold paper once data is received. For more information on the Park function, see "PARK/PATH" in "Chapter 2. Understanding the Operator Panel" in the *User's Guide* for your printer.
- 1 The printer performs the Park function for forms in the front path.

Select Emulation (DC4 DC4 ESC Y)

14	14	1B	59	NN
----	----	----	----	----

This command selects the printer emulation mode.

The values for NN are:

- 1 Epson FX 1050
- 2 4202 Proprinter III XL
- 5 4247 or 2381 Personal Printer

Select AFTA in Column (DC4 DC4 ESC Z)

14	14	1B	5A	NN
----	----	----	----	----

This command selects the column at 10 CPI where the Automatic Forms Thickness Adjustment (AFTA) will be made.

The value for NN is the column number.

Select Resident Font (DC4 DC4 ESC g)

14	14	1B	67	NN
----	----	----	----	----

This command selects the resident font based on the following values of NN:

- 0 Courier
- 1 Gothic
- 128 OCR-B
- 129 OCR-A

Request to Read Configuration (DC4 DC4 ESC h)

14	14	1B	68
----	----	----	----

This command requests the printer to send its configuration saved in non-volatile memory (NVM).

The printer must be configured for 1284 Parallel mode.

Printer Configuration Response (DC4 DC4 ESC h)

14	14	1B	68	LL	HH	TT	SS	D1...DN	CS
----	----	----	----	----	----	----	----	---------	----

This is the response Request to Read Configuration command.

The printer must be configured for 1284 Parallel mode. LL and HH indicate the number of bytes that follow this control. LL is the least significant byte of the count and HH is the most significant byte. (The number of bytes that follow equal $HH \times 256 + LL$.)

The other values are:

- TT Model Type
- SS Model Sub-type

D1...DN

Configuration Data

CS Checksum of the data bytes

Write Configuration Response (DC4 DC4 ESC i)

14	14	1B	69	LL	HH	TT	SS	D1...DN	CS
----	----	----	----	----	----	----	----	---------	----

This command writes configuration data to non-volatile memory (NVM).

The printer must be configured for 1284 Parallel mode. LL and HH indicate the number of bytes that follow this control. LL is the least significant byte of the count and HH is the most significant byte. (The number of bytes that follow equal $HH \times 256 + LL$.)

The other values are:

TT Model Type

SS Model Sub-type

D1...DN

Configuration Data

CS Checksum of the data bytes

Write Configuration Acknowledgement (DC4 DC4 ESC i)

14	14	1B	69	NN
----	----	----	----	----

This command acknowledges that the configuration was written to the printer. This is the response to the Write Configuration command.

The printer must be configured for 1284 Parallel mode.

NN is a single byte defined as follows:

X'00' Configuration Saved (Successful)

X'01' Configuration Not Saved (Error)

Select Print Quality

14	14	1B	70	NN
----	----	----	----	----

The values of NN are:

0 Fast Draft (model Z03 only)

1 DP

2 DP Text

3 NLQ

Buffer Terminating Conditions

The following controls cause buffered data to be released for printing:

- Carriage Return
- Line Feed
- Form Feed
- Reverse Line Feed
- Horizontal Tab
- Vertical Tab

- Backspace
- Set 1/8 Inch Line Spacing
- Set 7/72 Inch Line Spacing
- Set 1/6 Inch Line Spacing
- Set $n/216$ Inch Line Spacing
- Set $n/72$ Inch Line Spacing
- Invoke Text Line Spacing (if the line spacing is changed)
- Move Right $n/120$
- Move Left $n/120$
- Feed Paper $n/216$ Reverse
- Relative Move Baseline
- Shift Out/Double-Wide Print
- Device Control 4/Cancel Double-Wide Print
- Begin Subscript/Superscript
- End Subscript/Superscript
- Begin Double-Strike Print
- End Double-Strike Print
- Begin Emphasized Print
- End Emphasized Print
- Set Presentation Highlight
- Continuous Overscore
- Auto Underscore
- Device Control 2/Select 10 CPI
- Set 12 CPI
- Shift In/Condensed Print
- Proportional Space Mode
- Change Font
- Normal Density Bit Image Graphics
- Dual Density Bit Image Graphics Type 1
- Dual Density Bit Image Graphics Type 2
- High Density Bit Image Graphics
- Unidirectional Printing
- Set Horizontal Margins
- Set Initial Conditions

The following conditions also cause buffered data to be released for printing:

- Parallel -INIT
- Automatic Line Wrap

An automatic line wrap consists of a carriage return and line feed inserted after the maximum number of characters has been printed on a line. The next character is then printed at the left margin on the following line. Automatic line wrap occurs for text data but not for bit image graphics or advanced function graphics.

Unsupported Command Processing

The following Epson controls are not supported by the 4247. If any of these commands are received, they are ignored.

- Select 9 Pin Graphic Mode (ESC ^)
- Disable Paper-Out Sensor (ESC 8)
- Enable Paper-Out Sensor (ESC 9)
- Select Color (ESC r)
- Assign Character Table (ESC t)

Chapter 3. Intelligent Printer Data Stream

This chapter explains the concepts of the Intelligent Printer Data Stream (IPDS). IPDS is an orderable feature for your printer. The intent of this chapter is to provide a basic overview of how IPDS works. The *Intelligent Printer Data Stream Reference* provides detailed information about IPDS programming in general while Chapter 4, “IPDS Programming Information,” on page 99 provides a detailed description of the IPDS commands that the 4247 Model X03/Z03 printer uses. If the programming information in the *Intelligent Printer Data Stream Reference* is different from the programming information in this manual, use this manual to program the 4247 Model X03/Z03 printer.

Overview

The Intelligent Printer Data Stream (IPDS) is a structured-field data stream for managing and controlling printer processes. IPDS uses all points addressability that allows users to position text, images, graphic pictures, bar codes, and overlays at any defined point on a printed page. Later pages in this chapter explain each of these data types and their uses.

IPDS offers the flexibility of creating data and commands independent of the type of attachment protocol used by the printer or its system. Using the same data stream, printers can attach to control units or any type of network link that does not restrict the transmission of data to the printer.

IPDS commands within the data stream enable the host processor to control and manage the downloading of symbol sets and stored objects, such as overlays and page segments. The printer can later use these stored objects to construct a printed page.

The IPDS command structure also provides the means for returning error information to the host, for returning query information, and for performing error recovery actions.

Physical Medium

The 4247 Printer defines the physical medium as an area with boundaries of width and depth that define the limits of this page. The maximum print position (MPP) defines the width of the current page in characters.

$$\text{MPP} \times 1/\text{CPI} = \text{width in inches (CPI is the number of characters per inch)}.$$

The maximum page length (MPL) defines the depth of the current page in lines.

$$\text{MPL} \times 1/\text{LPI} = \text{depth in inches (LPI is the number of lines per inch)}.$$

The top margin on this page is the top-of-form position, as selected by pressing **SET TOP OF FORM** on the operator panel. Figure 5-1 shows the physical medium layout.

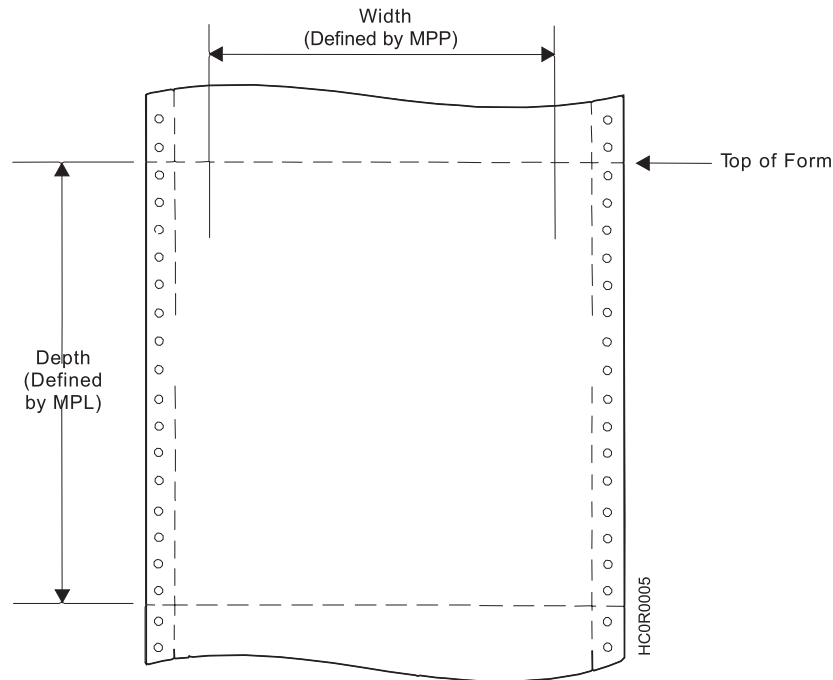


Figure 1. The Physical Medium

The physical medium defined above is assumed to coincide with the actual physical medium (form) as that terminology is used in the following discussion.

IPDS Coordinate Systems

IPDS uses coordinate systems to define any point on a page. All IPDS commands containing location parameters use these coordinate systems to define distance measurements. The coordinate systems specify these distances in logical units called *units*.

Many IPDS commands contain parameters that specify values for position or size in units. For example, one unit may equal approximately 0.018 mm (0.0007 in. [1/144 in.]). Before using these values, the 4247 Printer truncates the specified values to multiples of 0.18 mm (0.007 in. [1/1440 in.]) for all unit parameters except those associated with DP, and DP Text baseline positioning. The 4247 Printer truncates DP, and DP Text baseline positioning parameters to multiples of 0.36 mm (0.014 in. [1/72 in.]). The unit parameters are identified in Chapter 4, "IPDS Programming Information," on page 99.

X and Y Medium Coordinate System

The X_m and Y_m coordinates, known as the *medium coordinate system*, relate directly to the physical medium. The X_m , Y_m coordinate system is fixed for each medium or form size. IPDS commands cannot change the origin and the orientation of these coordinates. The origin ($X_m=0$, $Y_m=0$) is always at the top left hand corner of the physical medium. Positive X_m values begin at the origin and increase along the top of the sheet, from left to right. Positive Y_m values begin at the origin and increase along the left side of the sheet moving downward toward the bottom of the sheet. Figure 2 on page 77 shows the X_m , Y_m coordinate system:

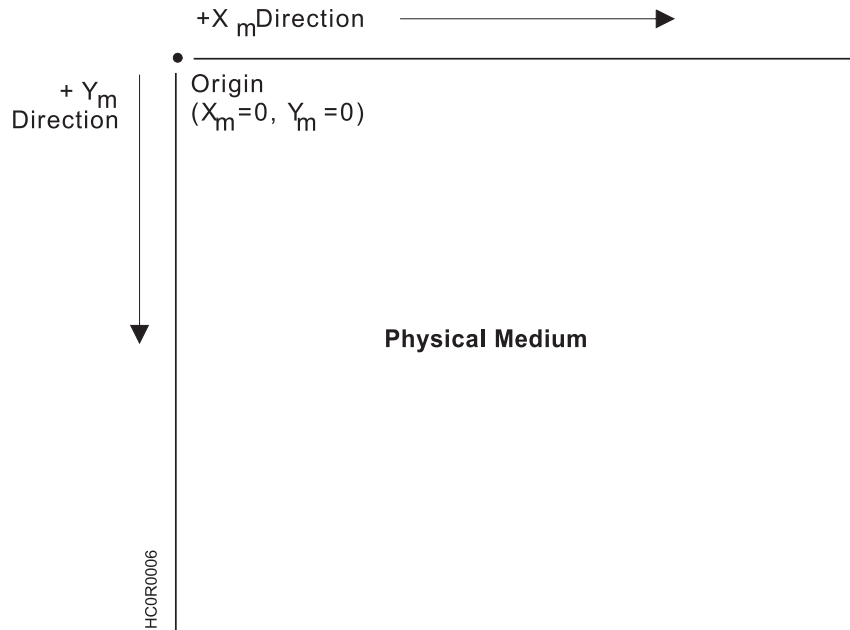


Figure 2. The X_m, Y_m Medium Coordinate System

Logical Page Layout

IPDS describes the printed output in terms of logical pages. The logical page does not have to be contained completely on the physical medium. However, printing can only occur where the two areas overlap. Figure 3 shows the physical-logical page relationship.

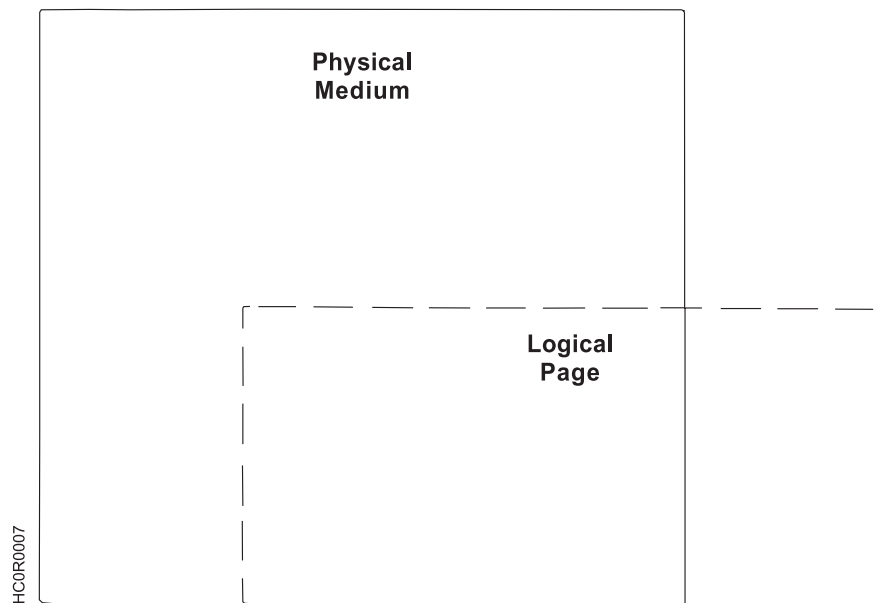


Figure 3. The Physical-Logical Page Relationship

The logical page reference corner is the corner of the logical page that is at the smallest X_p, Y_p position. This corner does not necessarily have to coincide with the physical medium origin ($X_m=0, Y_m=0$). The logical page size in the X dimension is the 'X-Extent', and the logical page size in the Y dimension is the 'Y-Extent'. IPDS commands specify the logical page size and location. Figure 5-4 shows the relationship

between the X and Y coordinates and the logical and physical medium.

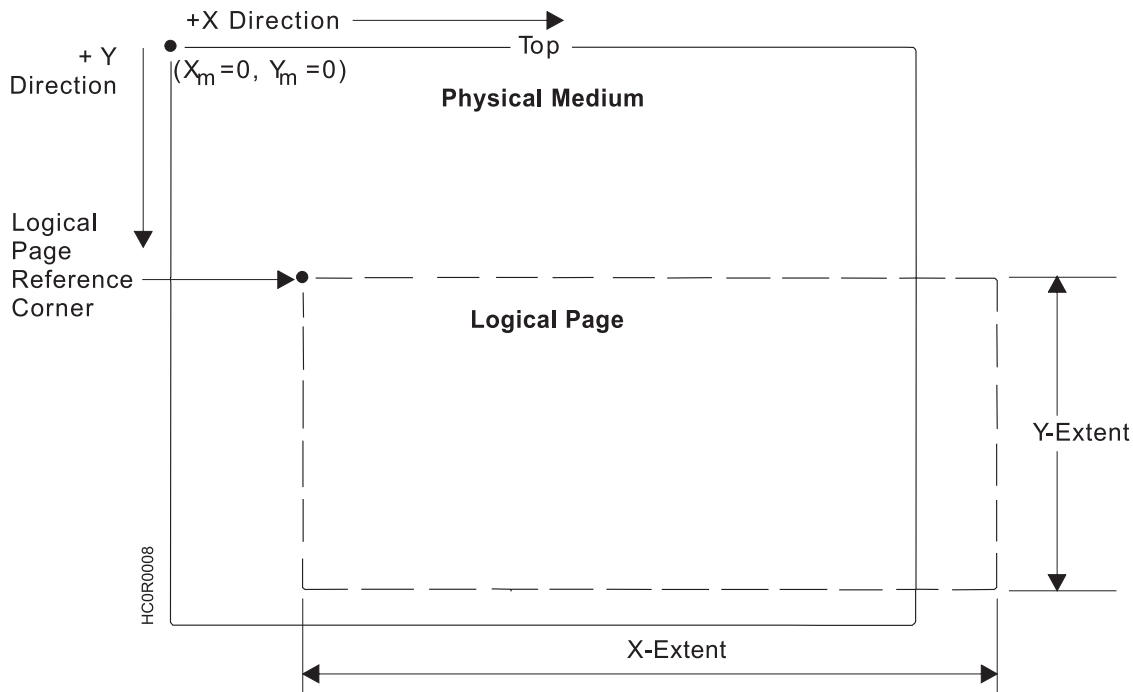


Figure 4. The X and Y Coordinate System and the Logical Page

I and B Coordinate System

In addition to the X,Y coordinate system, IPDS uses another coordinate system, the I-B coordinate system. These coordinates describe the placement and orientation of text or images on the logical page. The printer places characters along the I-axis for a line of text. The B-axis is the direction in which the printer places lines of text on the logical page. IPDS commands can change both the origin and the orientation of the I and B axes (see Figure 5 on page 79).

Direction: As the printer places text characters on the page, the inline coordinate increases. The direction of this increase is the positive inline direction or +I. The baseline coordinate also increases as the printer places text lines on the page. The direction of this increase is the positive baseline direction or +B. Location parameters within the IPDS commands specify the I and B directions. Chapter 4, “IPDS Programming Information,” on page 99 contains specific information about these commands.

Distance: The inline coordinate increases a predetermined distance as the printer places the text characters on the page. This distance is the character increment. The baseline coordinate also increases a predetermined distance as the printer places lines of text on the page. This distance is the baseline increment. Location parameters within the IPDS commands specify the I and B distances. Chapter 4, “IPDS Programming Information,” on page 99 contains specific information about these commands.

Initial coordinates: The coordinates of the first print position on the logical page are the initial coordinates. The initial inline print coordinate is I_i . The initial baseline print coordinate is B_i .

Current coordinates: The coordinates of the current print position on the logical page are the current coordinates. The current inline print coordinate is I_c . The current baseline print coordinate is B_c . Figure 5 on page 79 shows the various I and B coordinates on the logical page:

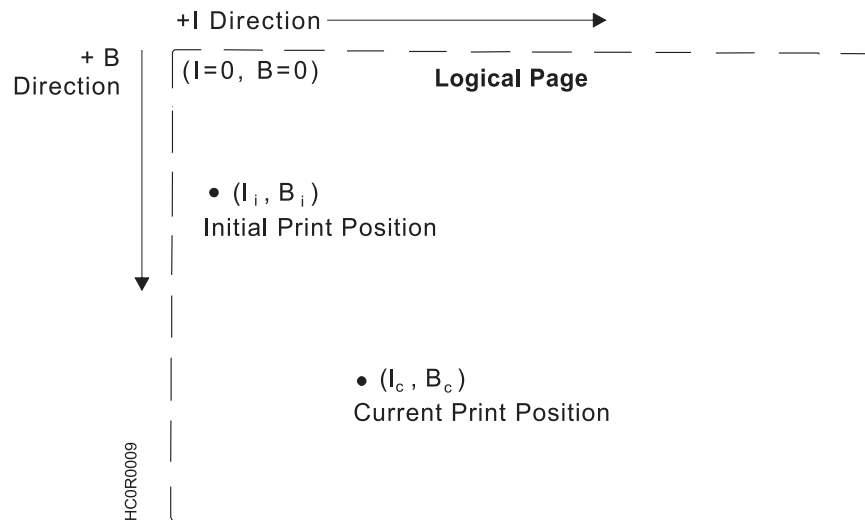


Figure 5. The I and B Coordinate System on the Logical Page

Notes:

1. The 4247 Printer text character box is 180 units high by 144 units wide at 10 CPI when the $X_p Y_p$ units equal 1,440 per inch. The left edge of the character box is at the specified inline position and the bottom edge of the character box is 20 units below the specified baseline position.
2. If the bottom edge of the character box falls below the printable area on the physical medium, the character will not print. In this situation, a baseline move (Relative Move Baseline or Absolute Move Baseline) text command can place the character box totally within the printable area.

Processing IPDS Commands

The structured field format of IPDS allows one or more commands to be sent to the printer in a continuous stream. Each command is self-describing; the command length, type, optional parameters, and data are all part of each specific command. The printer processes each command in the order it is received. Every IPDS command contains a flag byte. Setting the Acknowledgment Required bit on in this flag byte indicates to the printer the end of a command stream sequence. The printer then sends an Acknowledge Reply to the host. Figure 6 shows an example of an IPDS data stream:

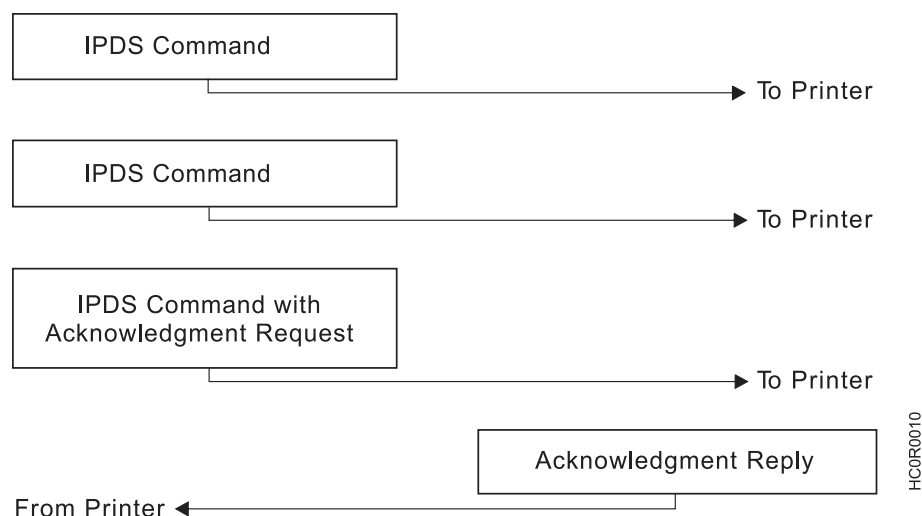


Figure 6. An Example of the IPDS Data Stream

IPDS Command Format

All of the printer commands use the following format:

Length	Command	Flag	Correlation ID	Data
--------	---------	------	----------------	------

Note: Bit numbering follows the EBCDIC convention with bit zero being the most significant bit. A description of each field follows.

Length				
--------	--	--	--	--

Length is a two-byte field that specifies the length of this command. This count includes the two-byte length field, the command field, the flag byte, and the optional fields (Correlation ID and Data Fields). The Length field can be any value from 5 to 32,767 (X'7FFF').

	Command			
--	---------	--	--	--

Command is a two-byte field that specifies the IPDS command code. See Table 1 on page 81 for a list of valid command codes.

		Flag		
--	--	------	--	--

Flag is a one-byte field that contains the IPDS command stream flags.

Bit 0 of this byte is the Acknowledgment Required (ARQ) flag. If this bit is on, the host requests the printer to send an Acknowledge Reply.

Bit 1 of this byte is the Correlation ID flag. If this bit is B'1', a two-byte correlation number follows this flag byte. If this bit is B'0', the optional correlation number is not present and the following byte or bytes contain the data field.

Bit 2 of this byte is the acknowledgement continuation flag. If this bit is B'1', the host is requesting continuation of the current Acknowledge Reply. If this bit is B'0', the host is not requesting continuation.

Bits 3-7 of the flag byte are reserved and must be zero.

			Correlation ID	
--	--	--	----------------	--

Correlation ID is a two-byte value that specifies an identifier for this command. The Correlation ID is an optional field and is only present if bit 1 of the flag byte is B'1'. The printer can use any value between 0000 and FFFF for this ID. If an error occurs on a command prior to acceptance for processing, the printer sends a negative acknowledgement (NACK) to the host. If the printer recognizes the command that caused the error, the Correlation ID field in the NACK will contain the ID of the command responsible for the NACK. Correlation ID is also returned in response to commands that request information and commands that request an acknowledgement.

				Data
--	--	--	--	------

Data is an optional field and is not present for all commands. This field contains specific subcommands, parameters, and data appropriate for the given command. The length of the data field can range from 0 to 32760 (X'7FF8') if the correlation ID is present. If the correlation ID is not present, the length of the data field can range from 0 to 32762 (X'7FFA').

Table 1 lists the valid IPDS commands for the 4247 Printer.

Table 1. Valid IPDS Command Codes for the 4247 Printer

Command	Hex Code	Description
SHS	D697	Set Home State
STM	D6E4	Sense Type and Model
NOP	D603	No Operation
LSS	D61E	Load Symbol Set
XOH	D68F	Execute Order Home State
XOA	D633	Execute Order Any State
BP	D6AF	Begin Page
EP	D6BF	End Page
LCC	D69F	Load Copy Control
LPD	D6CF	Logical Page Descriptor
LPP	D66D	Logical Page Position
WBCC	D680	Write Bar Code Control
WBC	D681	Write Bar Code
WGC	D684	Write Graphics Control
WG	D685	Write Graphics
WIC	D63D	Write Image Control
WI	D64D	Write Image
WT	D62D	Write Text
BO	D6DF	Begin Overlay
DO	D6EF	Deactivate Overlay
IO	D67D	Include Overlay
BPS	D65F	Begin Page Segment
DPS	D66F	Deactivate Page Segment
IPS	D67F	Include Page Segment
LE	D61D	Load Equivalence
LFE	D63F	Load Font Equivalence
DF	D64F	Deactivate Font
END	D65D	End

Acknowledge Requests and Replies

The following sections explain:

- Acknowledge Reply (ACK)
- Host Acknowledgment Requests
- Printer Acknowledgement Replies.

Acknowledge Reply (ACK)

The printer uses the Acknowledge Reply to return device status, sense information, and any additionally requested information to the host application program.

The application program uses the Acknowledge data to maintain control of the printing application and to initiate error recovery actions when necessary.

The format for the Acknowledge Reply is:

Length	D6FF	Flag	Data
--------	------	------	------

or

Length	D6FF	Flag	Correlation ID	Data
--------	------	------	----------------	------

The printer sends an acknowledgment:

- Whenever the acknowledgment required bit in the flag byte is on
- Whenever the printer detects a command stream error or device error and a negative response must be sent.

A negative reply (NACK), if required, has priority over a positive reply (ACK).

Length				
--------	--	--	--	--

Length is the total length of the ACK reply, including this field. The maximum length of this command is 255 bytes. If there is a five-byte command header (no correlation ID present), the data field can be up to 250 bytes long. If a correlation ID is present in the header, the maximum data field length is 248 bytes.

	D6FF			
--	------	--	--	--

D6FF in the command ID field indicates this is an Acknowledge Reply from the printer to the host.

		Flag		
--	--	------	--	--

Flag is a one-byte field that specifies the flags for this command. Bits 1, 2, and 7 are the only bits used in this byte. All other bits are reserved and must be zeros. If bit 1 is BX'1', a Correlation ID is present in this command. If bit 1 is BX'0', no Correlation ID is present. If bit 2 is B'1', the response can be continued in a later Acknowledge Reply. If bit 2 is B'0', the response is complete in this Acknowledge Reply.

			Correlation ID	
--	--	--	----------------	--

Correlation ID is a two-byte field that contains the identifier from a previously received command, such as Sense Type and Model. If the printer receives a command that requires an Acknowledgment Reply, and if that command contains a correlation ID, the printer also includes the same correlation ID in its corresponding field. Also, if an error occurs and the printer can recognize the command that caused the error, the printer includes the correlation ID of that command in the NACK.

				Data
--	--	--	--	------

Acknowledgement Type	Page/Copy Counters	Special Data (SD)
----------------------	--------------------	-------------------

DATA is the field that follows the correlation ID field or the flag byte if no correlation ID is present. The length of this field can be 0-250 (X'00'-X'FA') if no correlation ID is present, and 0-248 (X'00'-X'F8') if the correlation ID is present.

The first byte of the data field is the **acknowledgment type**. Values of 00, 01, 04, and 06 for this byte indicate a positive acknowledgment (ACK). A value of X'80' for this byte indicates a negative acknowledgment (NACK). Any other values for this byte are invalid.

The next 4 bytes of the data field are the **page/copy counters**. The first two page/copy counter bytes (most significant bytes) are a stacked page counter. This counter identifies how many pages have successfully stacked and printed. The last two page/copy counter bytes (least significant bytes) are reserved and must be zero.

Following the page/copy counter bytes is the Special Data (SD) area. Depending on the acknowledgment type, this field can be omitted, can contain requested printer information, or can contain sense information.

The following chart summarizes the acknowledgments and the special data areas:

Type	Meaning	Special Data Area Contents
X'00'	ACK	None
X'01'	ACK	Type and Model
X'04'	ACK	Resource List
X'06'	ACK	Printer Information
X'80'	NACK	Sense Bytes

For a detailed explanation of the Special Data (SD) area contents, see Chapter 4, "IPDS Programming Information," on page 99.

Host Acknowledgment Requests

The host requests an acknowledgment from the printer by setting the Acknowledgment Required (ARQ) flag bit on in the IPDS command (see "IPDS Command Format" on page 80). This request occurs in two instances:

1. In any command of a command sequence when the host wants a positive acknowledgment (ACK) that the printer has received and accepted the command sequence for processing.
2. In commands sent by the host to request the return of printer information.

If the printer receives a command that is normally used to request the return of printer data but the ARQ flag is not on, the printer ignores this command.

A positive acknowledgment (ACK) at the end of a command stream is equivalent to an ACK on each and every command preceding the command that has the ACK. An ACK is an indication from the printer that all commands since the last acknowledgment are accepted for processing.

Printer Acknowledgment Replies

The printer sends an Acknowledge Reply to the host to:

- Indicate that a received command or command sequence requesting acknowledgment has been accepted for processing
- Return requested printer information
- Report errors.

The printer sends a Negative Acknowledge Reply (NACK) to the host to indicate that an error has occurred.

The printer can send an ACK or a NACK in response to an ARQ. If an error occurs, the printer can send a NACK without receiving an ARQ.

The following general rules apply to the printer replies:

- If the printer receives a command requesting acknowledgment and this command also requests specific printer information, then:
 1. The printer sends a positive acknowledgment to the host, and
 2. The printer sends the requested information in the data field portion of the Acknowledge Reply.
- If the printer receives a command requesting acknowledgment and this command does not request specific printer information, then:
 1. The printer sends a positive acknowledgment to the host, and
 2. The printer does not include any information in the data field portion of the Acknowledge Reply.
- If the printer generates the Acknowledge Reply as a result of detecting an error, then the printer sends a Negative Acknowledgment (NACK) to the host. Under this condition, the printer also sends to the host information concerning the error. This error information is in the data field portion of the Acknowledge Reply.
- The Exception Handling Control command instructs the printer on error processing. For more information about the Exception Handling Control, see Chapter 4, “IPDS Programming Information,” on page 99.
- The printer can only return one error per NACK.
- If the printer receives a command requesting an acknowledgment, the printer expects the host to wait for the acknowledgment before sending further commands. If the printer receives additional commands from the host within the same transmission after the acknowledgment, the commands are ignored.

IPDS Data

There are various forms of data that the printer uses for creating the output page. These include text, graphics, bar codes, and images. The printed page can include any combination of this data.

Text data contains lines of character information which the printer places in sequence on the page.

Graphics data contains lines, arcs, markers, and other elements which present a printed picture.

Bar code data is a data type that supports applications requiring precision printing of encoded information in a form that is recognizable by scanning devices.

Image data contains rectangular arrays of information. The array consists of a sequence of scan lines. Each scan line consists of picture elements (pels). The image data contains one (dot position) bit per pel.

The text, graphics, bar code, and image data types each have their own unique commands. Chapter 4, “IPDS Programming Information,” on page 99 contains a detailed description of these commands.

Blocks of graphics, image, or bar code data are presented as a single unit to the printer. The printer enters the appropriate Block State (graphics block, image block, or bar code block) to create the entire data group for that block of data.

Page segments and **overlays** are any combinations of text, graphics, bar codes, and images. The printer can store these segments and overlays for later use as the page is created. For information about segments, see “Include Page Segment (IPS)” on page 195. For information about overlays, see “Begin

Overlay (BO)” on page 194. Figure 7 shows various data types on a page.

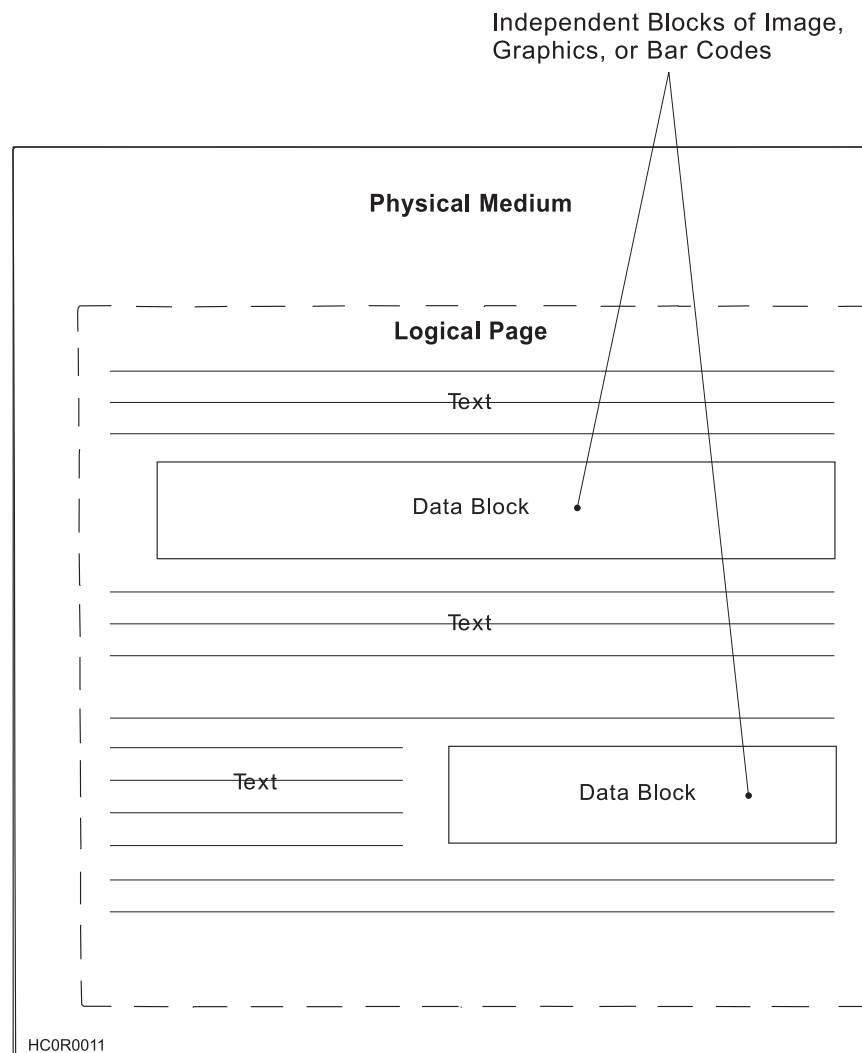


Figure 7. A Sample Page Constructed on an IPDS Printer

Notes:

1. Overlays and page segments can be merged on this page.
2. Text and data blocks can be positioned at different places on this page.
3. A logical page can be positioned anywhere with respect to the physical medium.

Mixing Rules

IPDS allows the same physical pel to be overwritten an unlimited number of times. Overwriting can occur both within a block and across blocks. For example, within text blocks, overwriting can be caused by using the Overstrike control. Within a graphics block, overwriting occurs whenever one graphics area or figure overlays another. Across block overwriting can occur whenever one IPDS block physically overlays any portion of another IPDS block.

Within each block, the 4247 Printer further defines background pels and foreground pels. Foreground pels are:

- The one pels of a character

- The pels of a rule
- The one pels of an image
- The pels of a graphic line or arc
- The one pels of a filled area
- The one pels of a bar code.

Background pels are all other pels.

Text data, because it prints at a different physical resolution than the data in the other blocks, does not logically mix with any other data type. The only mixing that takes place between text data and any other data type is the (possible) physical mixing of ink on forms.

For the 4247 Printer, the mixing rule for overwritten data within a given block of image, graphics, or bar code data is quite simple: background pels are transparent; foreground pels are opaque. Thus, background pels always show through what is underneath (what was received earlier), while foreground pels cover it up. In other words, a pel prints in the color of its last overwriting.

Note: Color of medium is a valid color for image, graphics, and bar code data. Thus, foreground pels in this color cover up pels of any other color that are underneath.

For the 4247 Printer, the mixing rule for overwritten data across blocks is the same as it is within blocks except for text. Thus, across image and graphics, or bar code blocks, background pels are transparent, while foreground pels are opaque.

IPDS Operating States

There are various operating states using the IPDS commands. The following states define the operating environment for this printer:

- Home state
- Page state
- Overlay state
- Page segment state
- Block state.

While in the page, overlay, or page segment state, the printer can enter a block state. The block state causes the printer to process a block of data. There are image blocks, graphics blocks, and bar code blocks. Thus, the printer can enter any of the data block states from any of the operating states.

Home State

Home state is the initial IPDS operating state. The printer returns to home state at the end of each page, page segment, or overlay. In addition, the printer can enter the home state by receiving a Set Home State command. The 4247 Printer also goes to home state when a NACK is returned.

While in the home state, the printer receives control and initialization commands to prepare for a print operation. In this state, the printer can also receive commands that request the return of printer information to the host application program.

Page State

Page state is the operating state for printing a logical page. The printer enters the page state from the home state as a result of receiving a Begin Page command.

In the page state, the printer can receive commands that merge previously defined and loaded overlay and page segments with the current page information. The printer can also receive Write Text commands that position text on the logical page. The presence of Write Image (block) Control, Write Graphics (block)

Control, or Write Bar Code (block) Control commands in the data stream indicates that the printed page contains individual blocks of image, graphics, or bar code data for positioning on the page. These commands cause a state transition to occur to an appropriate page block state. In the block state, the printer establishes the initial conditions and processes the block of data onto the page. Receiving an End command in a page block state terminates that state and returns processing back to the page state.

Figure 8 shows the relationship between the home state, page state, and block states.

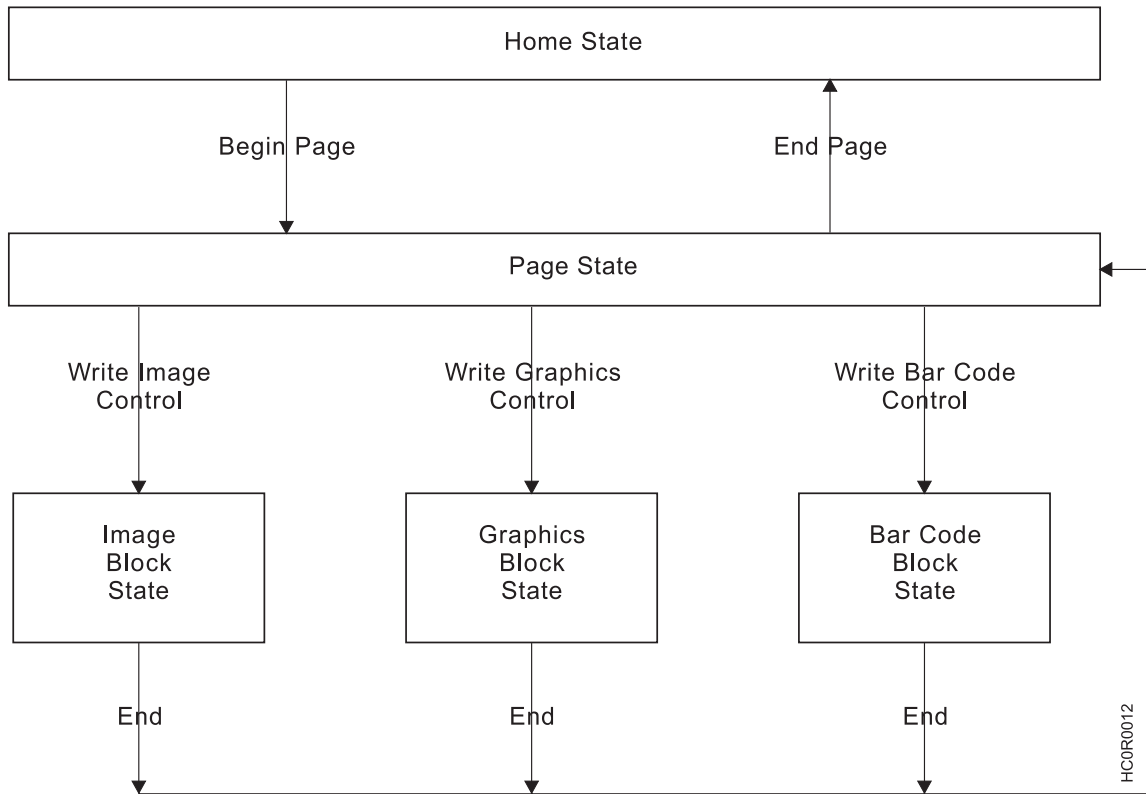


Figure 8. The Relationship between Home State, Page State, and Block States

Overlay State

Overlay state is the operating state that stores data in the printer. The printer enters the overlay state from the home state as a result of receiving a Begin Overlay command.

A parameter in the Begin Overlay command provides an identifier for later references to this overlay. The printer saves the currently active Logical Page Descriptor value, the Load Font Equivalence value, and the Load Equivalence value as part of the stored overlay definition.

The same commands that the printer uses in the page state are also valid while in the overlay state.

Figure 9 on page 88 shows the relationship between the home state, overlay state, and block states.

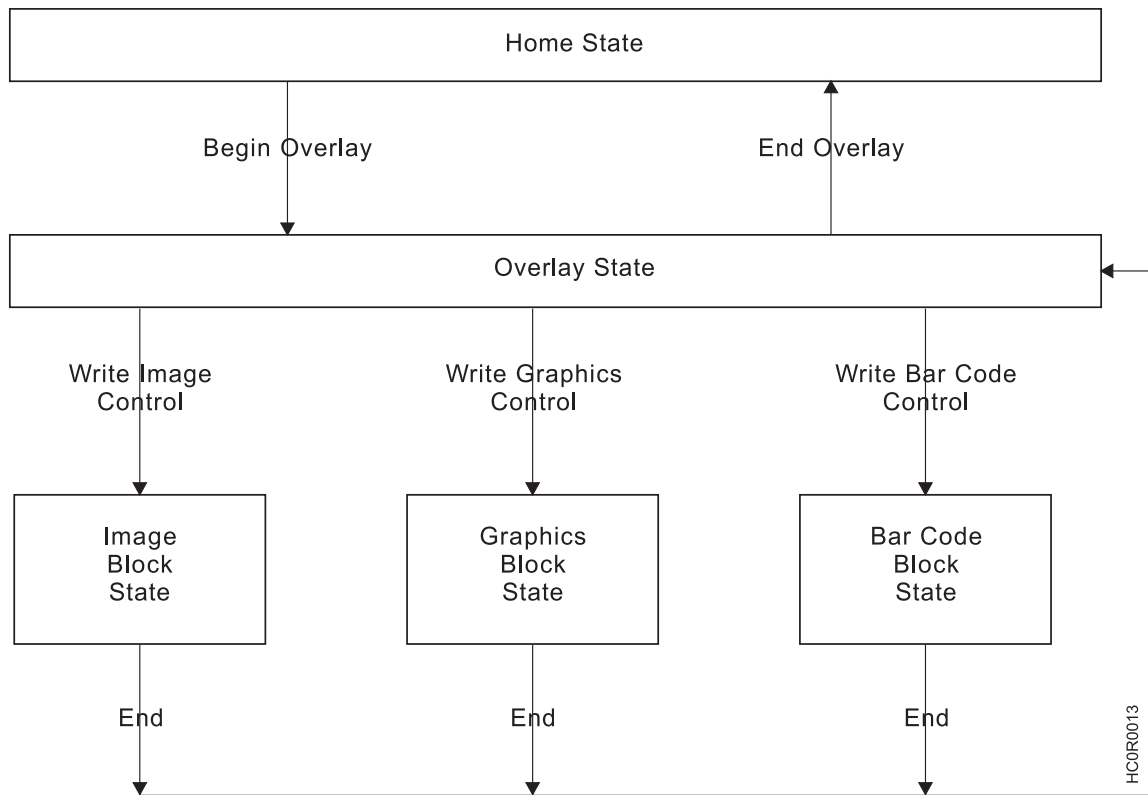


Figure 9. The Relationship between Home State, Overlay State, and Block State

Page Segment State

The printer enters the page segment state from the home state as a result of receiving a Begin Page Segment command. A parameter in the Begin Page Segment command provides an identifier for later references to this segment.

Page segments assume the environment (Logical Page Descriptor, Load Font Equivalence, and Load Equivalence) that is active at the time the segment is presented.

While in a page segment state, the printer can only receive commands to write text, image, bar code, and graphics blocks.

Figure 10 on page 89 shows the relationship between the home state, page segment state, and block states.

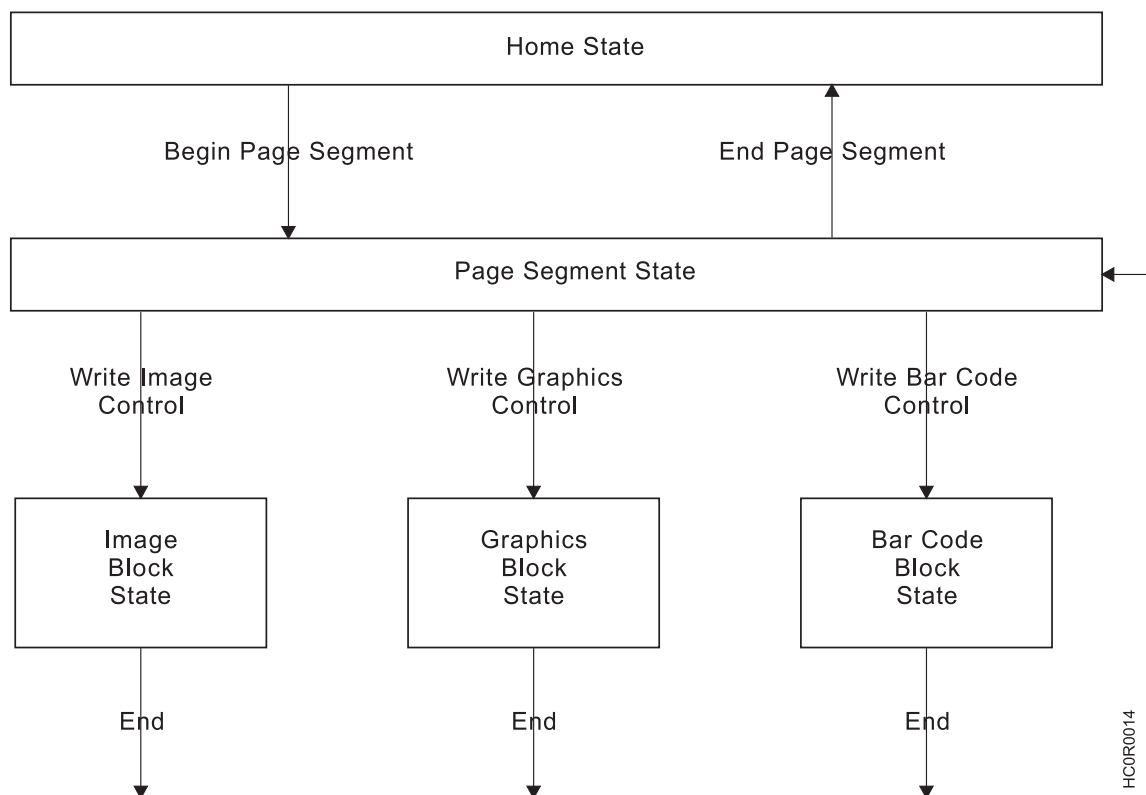


Figure 10. The Relationship between Home State, Page Segment State, and Block States

A Summary of the IPDS States and Commands

Table 2 shows all the valid IPDS commands for the 4247 Printer and the initial and ending states for each command. The printer must be in the initial state shown for each command for that command to be valid. The ending state is the resulting state the printer enters after a valid command processes.

Table 2. IPDS Command Code Summary for the 4247 Printer

Cmd	Hex Code	Description	Initial State	Ending State
SHS	D697	Set Home State	Any	Home
STM	D6E4	Sense Type and Model	Any	No Change
NOP	D603	No Operation	Any	No Change
LSS	D61E	Load Symbol Set	Home	Home
XOH	D68F	Execute Order Home State	Home	Home
XOA	D633	Execute Order Any State	Any	No Change (See Note 1)
BP	D6AF	Begin Page	Home	Page
EP	D6BF	End Page	Page, Page Segment, or Overlay	Home
LCC	D69F	Load Copy Control	Home	Home
LPD	D6CF	Logical Page Descriptor	Home	Home
LPP	D66D	Logical Page Position	Home	Home

Table 2. IPDS Command Code Summary for the 4247 Printer (continued)

Cmd	Hex Code	Description	Initial State	Ending State
WBCC	D680	Write Bar Code Control	Page, Page Segment, or Overlay	Page Bar Code Block, Page Segment Bar Code Block, or Overlay Bar Code Block
WBC	D681	Write Bar Code	Page Bar Code Block, Page Segment Bar Code Block, or Overlay Bar Code Block	No Change
WGC	D684	Write Graphics Control	Page, Page Segment, or Overlay	Page Graphics Block, Page Segment Graphics Block, or Overlay Graphics Block
WG	D685	Write Graphics	Page Graphics Block, Page Segment Graphics Block, or Overlay Graphics Block	No Change
WIC	D63D	Write Image Control	Page, Page Segment, or Overlay	Page Image Block, Page Segment Image Block, or Overlay Image Block
WI	D64D	Write Image	Page Image Block, Page Segment Image Block, or Overlay Image Block	No Change
WT	D62D	Write Text	Page, Page Segment, or Overlay	No Change
BO	D6DF	Begin Overlay	Home	Overlay
DO	D6EF	Deactivate Overlay	Home	Home
IO	D67D	Include Overlay	Page or Overlay	No Change
BPS	D65F	Begin Page Segment	Home	Page Segment
DPS	D66F	Deactivate Page Segment	Home	Home
IPS	D67F	Include Page Segment	Page or Overlay	No Change
LE	D61D	Load Equivalence	Home	Home
LFE	D63F	Load Font Equivalence	Home, Page, Page Segment, or Overlay	No Change
DF	D64F	Deactivate Font	Home	Home
END	D65D	End	See Note 2	See Note 2

Notes:

1. The Discard Buffered Data subcommand in the Execute Order Any State command causes the printer to enter the home state.
2. The End command is valid in any page block, overlay block, or page segment block state and causes the printer to return to the corresponding page, overlay, or page segment state.

Figure 11 on page 91 shows all of the IPDS states and their commands. Notice that some commands can only occur in a specific state, some commands can occur in more than one state, and some commands can occur in any state. Also note that the printer can only enter the page state, the page segment state, and the overlay state from the home state.

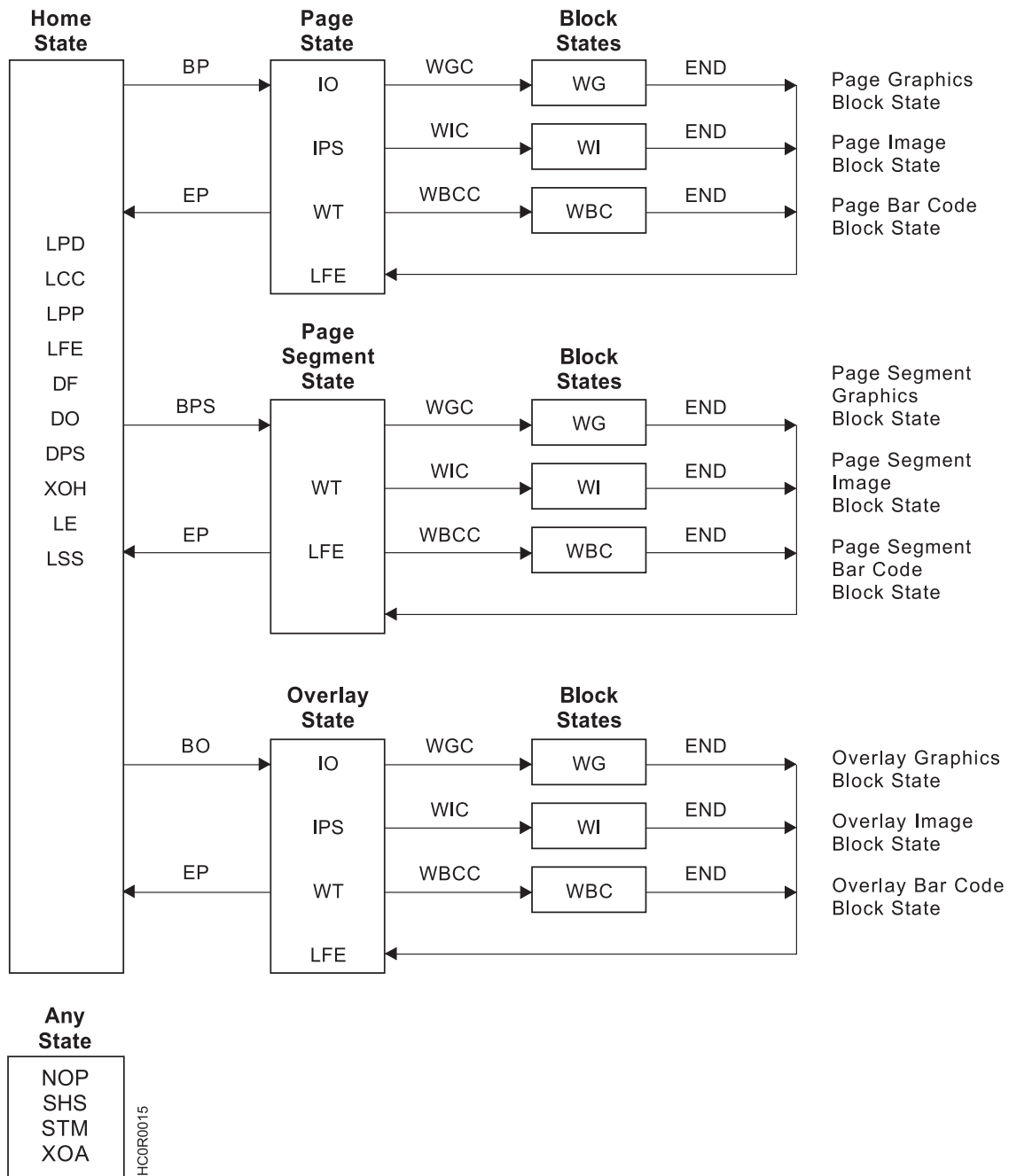


Figure 11. The Complete IPDS State Diagram

A Typical IPDS Command Sequence

The following chart shows an example of a typical IPDS command sequence. This sequence contains five basic categories:

1. Initialization
2. Preparation
3. Page Segment
4. Overlay
5. Page

Each category starts with a command from the host to the printer and ends with an acknowledgment from the printer to the host. An analysis of each category follows this example.

Note: → indicates a command from the host to the printer. ← indicates a reply from the printer to the host.

Table 3. An Example of an IPDS Command Sequence

Printer State	Command Direction	CMD	Command Name	Description
Initialization Sequence	→	STM	Sense Type and Model	Request Device Information
	←	ACK	Acknowledgement Response	Return Type/Model Information
Preparatory Sequence	→	SHS	Set Home State	Set Printer Home State
	→	LPD	Logical Page Descriptor	Define Logical Page
	→	LPP	Logical Page Position	Locate Logical Page
	→	LCC	Load Copy Control	Load Page Copy Information
	→	LFE	Load Font Equivalence	Load Font Mapping
	←	ACK	Acknowledgement Response	Acknowledge Successful Operation
Page Segment Sequence	→	BPS	Begin Page Segment	Set Printer to Page Segment State
	→	WT	Write Text	Store Text Data in Page Segment
	→	WT	Write Text	Store Text Data in Page Segment
	→	WT	Write Text	Store Text Data in Page Segment
Block State	→	WIC	Write Image Control	Start Page Segment Image Block State
	→	WI	Write Image	Store Image Data in Page Segment
	→	WI	Write Image	Store Image Data in Page Segment
End Block State	→	END	End	End Image Block State
	→	WT	Write Text	Store Text Data in Page Segment
	→	WT	Write Text	Store Text Data in Page Segment
	→	EP	End Page	Return to Home State
	←	ACK	Acknowledgement Response	Acknowledge Successful Operation
Overlay Sequence	→	BO	Begin Overlay	Enter Overlay State
	→	WT	Write Text	Store Text Data in Overlay
	→	WT	Write Text	Store Text Data in Overlay
	→	WT	Write Text	Store Text Data in Overlay
	→	IO	Include Overlay	Include Another Overlay
Block State	→	WGC	Write Graphics Control	Enter Overlay Graphics Block State
	→	WG	Write Graphics	Store Graphics Data in Overlay
	→	WG	Write Graphics	Store Graphics Data in Overlay

Table 3. An Example of an IPDS Command Sequence (continued)

Printer State	Command Direction	CMD	Command Name	Description
End Block State	➡	END	End	End Overlay Graphics Block State
	➡	WT	Write Text	Store Text in Overlay
	➡	WT	Write Text	Store Text in Overlay
	➡	IO	Include Overlay	Include Another Overlay
	➡	IPS	Include Page Segment	Include Page Segment in Overlay
	➡	EP	End Page	Return to Home State
	⬅	ACK	Acknowledgement Response	Acknowledge Successful Operation
Page Sequence	➡	BP	Begin Page	Enter Page State
	➡	WT	Write Text	Send Text Data to Printer
	➡	IO	Include Overlay	Print Overlay
	➡	IPS	Include Page Segment	Print Page Segment
Block State	➡	WIC	Write Image Content	Start Page Segment Image Block State
	➡	WI	Write Image	Send Image Data to Printer
	➡	WI	Write Image	Send Image Data to Printer
End Block State	➡	END	End	End Image Block State
	➡	WT	Write Text	Send Text Data to Printer
	➡	WT	Write Text	Send Text Data to Printer
	➡	IO	Include Overlay	Print Overlay
	➡	IPS	Include Page Segment	Print Page Segment
	➡	EP	End Page	Complete All Printing and Return to Home State
	⬅	ACK	Acknowledgement Response	Acknowledge Successful Operation

Printer Initialization and Preparation Sequence

Before any printing begins, it is necessary to specify certain parameters and conditions for the printer. The following sample command sequence accomplishes this task:

- STM (Sense Type and Model)
- ACK (Acknowledgment Reply)
- SHS (Set Home State)
- LPD (Logical Page Descriptor)
- LPP (Logical Page Position)
- LCC (Load Copy Control)
- LFE (Load Font Equivalence)
- ACK (Acknowledgment Reply).

Note: This sequence is only a typical example. It is not mandatory for the host to send all of these commands.

STM (Sense Type and Model): The host sends the STM command to sense the printer characteristics.

ACK (Acknowledgment Reply): If the previous command had the ARQ bit on, the printer responds with type and model information to the host. This information includes printer number (4247), model, and the various function set vector information.

SHS (Set Home State): The host sends the SHS command to make sure the printer is in the home state before the start of a print job.

LPD (Logical Page Descriptor): The LPD command sets print characteristics for the logical page. These parameters include:

- Page size
- Initial coordinates
- Initial left margin
- Intercharacter increment
- Baseline increment
- Font ID
- Text color.

LPP (Logical Page Position): The LPP command positions the upper-left corner of the logical page (as defined by the LPD command) with respect to the top-of-form setting. This command locates the logical page on the physical medium.

LCC (Load Copy Control): The LCC command specifies which overlays to include on each subsequent page and which suppressions to activate for each page. Suppression allows selective suppression of data while printing.

LFE (Load Font Equivalence): The LFE command maps a local font identifier (from within the text, graphics, or bar code data) to a global ID used for resource management. This command also specifies for each font attributes, such as bold, double-strike, double-wide, and italics.

ACK (Acknowledgment Reply): If the previous command had the ARQ bit on, the printer responds with the ACK reply to inform the host of successful execution of all the previous commands. This command indicates to the host that the printer is now ready to accept data for print operations. This is the end of the initialization and preparation sequence.

Page Segment Sequence

The page segment sequence creates one or more page segments for later printing. The following command sequence illustrates the loading of a sample page segment:

- BPS (Begin Page Segment)
- WT (Write Text)
- WIC (Write Image Control)
- WI (Write Image)
- END (End)
- WT (Write Text)
- EP (End Page)
- ACK (Acknowledgment Reply).

Note: This sequence is only an example. A page segment can contain any combination of text, image, graphics, or bar code data.

BPS (Begin Page Segment): The host sends the BPS command to the printer, causing the printer to leave the home state and enter the page segment state. The page segment state creates a segment of page data to save within the printer for later printing. The BPS command contains an identifier (ID) for later use in selecting this segment. This segment can contain combinations of text, images, bar codes, and graphics.

WT (Write Text): The WT command sends text data to the printer. Because the printer is currently in a page segment state, this text information does not print at this time. Instead, the data becomes part of the page segment. The host can send multiple WT commands to the printer while in the page segment state.

WIC (Write Image Control): The WIC command causes the printer to enter the image block state. Parameters in this command define the image size, scale, initial coordinates, and color of the image.

WI (Write Image): The WI command sends a block of image data to the printer. One or more of these commands create the actual image for later printing.

END (End): The END command terminates the image block state. The printer remains in the page segment state with the image stored for later use.

WT (Write Text): This command is repeated at this point in the sequence to illustrate that additional text data can be added to the page segment. In addition to zero or more of the WT commands, this segment could also include additional graphics data, image data, or bar code data.

EP (End Page): The EP command causes the printer to leave the page segment state and return to the home state. We recommend that this command contain an acknowledgment request to let you know of successful execution of the page segment.

ACK (Acknowledgment Reply): If the previous command had the ARQ bit on, the printer responds with the ACK command to inform the host of successful execution of all the previous commands. This command indicates to the host that the printer has accepted all the segment data and stored this information for later printing.

Overlay Sequence

The overlay sequence creates one or more overlays for later printing. The following command sequence illustrates the loading of a typical overlay:

- BO (Begin Overlay)
- WT (Write Text)
- IO (Include Overlay)
- WGC (Write Graphics Control)
- WG (Write Graphics)
- END (End)
- WT (Write Text)
- IO (Include Overlay)
- IPS (Include Page Segment)
- EP (End Page)
- ACK (Acknowledgment Reply).

Note: This sequence is only an example. An overlay can contain any combination of text, image blocks, graphics blocks, bar code blocks, page segments, or overlays.

BO (Begin Overlay): The host sends the BO command to the printer causing the printer to leave the home state and enter the overlay state. The overlay state creates an overlay of data to save within the printer for later printing. The BO command contains an identifier (ID) for later use in selecting this overlay.

WT (Write Text): The WT command sends text data to the printer. Because the printer is currently in an overlay state, this information does not print at this time. Instead, the data becomes part of the overlay. The host can send multiple WT commands to the printer while in the overlay state.

IO (Include Overlay): The IO command causes a previously stored overlay to merge onto the current overlay. This command contains an ID field that selects the desired overlay.

WGC (Write Graphics Control): The WGC command causes the printer to enter the graphics block state. Parameters in this command specify the placement, size, and orientation of the graphics block.

WG (Write Graphics): The WG command sends graphics data to the printer. The graphics data (contained in drawing orders) specifies the various elements of the graphic. These include color, size, line type, line width, and other parameters. One or more WG commands present the graphics picture.

END (End): The END command terminates the graphics block state. The printer remains in the overlay state with the graphics block as part of the overlay.

WT (Write Text): This command is repeated at this point in the sequence to illustrate that additional text data can be added to the overlay. In addition to zero or more of the WT commands, image data, bar code data, or additional graphics data could also be included in the overlay.

IO (Include Overlay): The IO command causes a previously stored overlay to merge onto the current overlay.

IPS (Include Page Segment): The IPS command causes a previously stored page segment to merge onto the current overlay. An ID in this command specifies the selected page segment.

EP (End Page): The EP command causes the printer to leave the overlay state and return to the home state. We recommend that this command contain an acknowledgment request to verify successful transmission of the overlay.

ACK (Acknowledgment Reply): If the previous command had the ARQ bit on, the printer responds with the ACK reply, to inform the host of successful execution of all the previous commands. This reply indicates to the host that the printer has accepted all the overlay data and stored this information for later printing.

Page Sequence

The page sequence causes data to print on the current page. This data can include previously stored overlays or page segments, as well as text data. The following commands illustrate a typical page sequence:

- BP (Begin Page)
- WT (Write Text)
- IO (Include Overlay)
- IPS (Include Page Segment)
- WIC (Write Image Control)
- WI (Write Image)
- END (End)
- WT (Write Text)
- IO (Include Overlay)
- IPS (Include Page Segment)
- EP (End Page)
- ACK (Acknowledgment Reply).

Note: This sequence is only an example. A page can contain any combination of text, image blocks, graphics blocks, bar code blocks, page segments, or overlays.

BP (Begin Page): The host sends the BP command to the printer, causing the printer to leave the home state and enter the page state.

WT (Write Text): The WT command sends text data to the printer. Because the printer is currently in a page state, this text information prints at this time. The host can send multiple WT commands to the printer while in the page state.

IO (Include Overlay): The IO command causes a previously stored overlay to merge onto the current page. This command contains an ID field, which selects the desired overlay.

IPS (Include Page Segment): The IPS command causes a previously stored page segment to merge onto the current page. An ID in this command specifies the selected page segment. The selected page segment now prints on the current page.

WIC (Write Image Control): The WIC command causes the printer to enter the image block state. Parameters in this command define the image size, scale, initial coordinates, and color of the image.

WI (Write Image): The WI command sends a block of bit image data to the printer. One or more of these commands create the actual image for printing. Because the printer is now in the page state, the image prints as it is received by the printer.

END (End): The END command terminates the image block state. The printer remains in the page state.

WT (Write Text): This command is repeated at this point in the sequence to illustrate that additional text data can be added to the page. In addition to zero or more of the WT commands, graphics data, bar code data, or additional image data could also be included on the page.

IO (Include Overlay): The IO command causes a previously stored overlay to merge onto the current page. This overlay now prints on the current page.

IPS (Include Page Segment): The IPS command causes a previously stored page segment to merge onto the current page. An ID in this command specifies the selected page segment. The selected page segment now prints on the current page.

EP (End Page): The EP command causes the printer to leave the page state and return to the home state. We recommend that this command contain an acknowledgment request to verify successful execution of the page data.

ACK (Acknowledgment Reply): If the previous command had the ARQ bit on, the printer responds with the ACK reply to inform the host of successful execution of all the previous commands. This reply indicates to the host that the printer has accepted all the page data, and all selected segments, images, or overlays have successfully printed.

Chapter 4, “IPDS Programming Information,” on page 99 contains a more detailed description of all the IPDS commands.

Error Handling

An exception (error) occurs when the printer detects an invalid or unsupported command, control, or parameter value in the data stream received from the host. The IPDS error handling structure assigns a unique exception code to each type of error. The printer sends these codes to the host, as sense bytes, in the NACK (negative acknowledgment reply). See Chapter 5, “IPDS Exception Reporting Codes,” on page 199 for a description of the exception codes.

The host can control how the printer responds to the exceptions. The Exception Handling Control (see “Exception Handling Control (EHC)” on page 126) order permits independent control over three exception handling functions:

- The exceptions to report with a NACK reply
- The implementation of Alternate Exception Actions (AEA) when a valid parameter value is received but not supported by the printer
- The termination or continuation procedure to follow if the alternate error action is not taken or if there is no alternate error action associated with this error.

The host application program can use the Exception Handling Control order to accomplish many specific control capabilities necessary in data printing environments. For example, through the proper selection of settings, it is possible to:

- Enforce control over printing of page information
- Enable automatic skipping of data types not supported by the printer
- Suppress the return of meaningless or redundant exception reports when alternate actions are acceptable to the user.

The host can issue the Exception Handling Control order in any printer state. This allows the host to manage exception processing at any level desired by the host application.

Chapter 4. IPDS Programming Information

This chapter contains programming information for the Intelligent Printer Data Stream (IPDS) commands. The information is for the experienced programmer. A knowledge of data stream requirements, hexadecimal numbering systems, and data processing terminology and concepts is assumed.

In addition to the information in this chapter, Chapter 3, “Intelligent Printer Data Stream,” on page 75 contains introductory information about the IPDS.

IPDS Initialization Defaults

When the printer power switch is initially turned On (I), various IPDS data stream parameters are set to their *initialization default* values. These values remain in effect until overridden by specific data stream commands from the host application program.

Table 4 contains the initialization defaults for this printer:

Table 4. IPDS Initialization Defaults

Default Description	Hex Value
Units Base Value	00 (10 in.)
Input Media Source	Determined by Operator Panel Paper Source setting
Width of the Physical Medium	MPP Value, Operator Panel Selection
Length of the Physical Medium	MPL Value, Operator Panel Selection
Width of the Logical Page in Units (X-Extent)	4A40 (Decimal 13.2 in. Width, 1440 Units Per In.)
Length of the Logical Page in Units (Y-Extent)	3DE0 (Decimal 11 in. Length, 1440 Units Per In.)
Ordered Data Flags	00 (Unordered Page, Block, and Text Flags)
X-Axis Orientation	0000 (0 Degrees)
Y-Axis Orientation	2D00 (90 Degrees)
Current I Text Position	0000
Current B Text Position	00A0 The Default Font Type Baseline (see Note 1)
X-Displacement	0000 Logical Page X-Displacement from the Physical Medium Origin
Y-Displacement	0000 Logical Page Y-Displacement from the Physical Medium Origin
Initial Inline Margin in Units	0000
Intercharacter Adjustment	0000
Baseline Increment	LPI value, Operator Panel Selection
Local Font ID	FF (see Note 3)
Text Color	Black
Code Page ID	Language value, Operator Panel selection
Font Quality	Print Quality value, Operator Panel selection
Font Type	Determined by Print Quality and CPI value Operator Panel selection (see Note 2)
Exception Handling Control	Report Undefined Characters, Position Checks, and All Other Exceptions. Do Not Take Alternate Exception Action. Terminate, Print Page, and Go to Home State.

Notes:

1. Text printing on the first line requires an initial Y-displacement value of 00A0.

2. The printer default font is Gothic for DP and fast draft print quality and Courier for DP Text and NLQ print quality. To determine the current values for CPI, language and quality, refer to the *User's Guide* for your printer.
3. When Local Font ID equals FF is used, the latest inline sequence established in "Logical Page Descriptor (LPD)" on page 111 determines whether to print in a left-to-right or right-to-left sequence. The default when the printer is powered on is the left-to-right sequence.

Parameter Values

The 4247 Printer allows flexibility in selecting various options to perform a wide range of functions. Parameter values are initially set at the factory. The printer uses these values to format the page and to control forms movement. The parameter values also allow the operator to select the printer address, language, and print mode and compatibility options, and to turn the alarm on or off.

The printer can use the initial factory set values, or the operator can change these values. Any new value selection made at the operator panel becomes the new parameter value immediately upon selection. If this configuration is saved by the operator into the power-on custom set, this value remains as the new parameter value, even after the printer power switch is turned Off (O).

The operator can select the following parameter values at the operator panel and change them:

- Characters per inch (CPI)
- Lines per inch (LPI)
- Maximum print position (MPP)
- Maximum page length (MPL) (See Note)
- Language
- Print quality
- Alarm (Enabled/Disabled)
- Graphics and Bar Code mode
- Left margin
- Emulation mode

Note: An MPL setting that results in a page length less than 762 mm (3 in.) causes a throughput reduction. A maximum reduction of about 50 percent occurs at an MPL setting of one line per page.

The application program can override any of the parameter values, except for turning the alarm on or off changing the address selection, changing the emulation determines what parameter value the printer uses:

1. The printer uses the program specified value.
2. If no program command has specified the value, the printer uses the current parameter value.

Command Format

All the printer commands use the following format:

Length	Command	Flag	Correlation ID (Optional)	Data
--------	---------	------	---------------------------	------

The following chart shows the purpose of each field:

Byte	Field	Description
0-1	Length	Total Command Length, Including the Length Bytes
2-3	Command	Command Type

Byte	Field	Description
4	Flag	Bit 0 0 = Acknowledge Response Not Required 1 = Acknowledge Response Required Bit 1 0 = Correlation ID Not Included 1 = Correlation ID Included Bit 2 0 = Acknowledge Reply Response is Complete 1 = Second Buffer of XOH - OPC Reply Required Bit 3 - 6 Reserved (Always Zero) Bit 7 0 = Persistent NACK is inactive 1 = Persistent NACK
5-6	Correlation ID	Identifier Name (Valid Only if Byte 4, Bit 1 Is On)
7-n	Data	Specific Subcommands, Operands, Parameters, and Data Fields as Appropriate for the Given Command

Notes:

1. Bit numbering follows the EBCDIC convention with bit zero being the most significant bit.
2. If the Correlation ID field is not present (byte 4, bit 1 is zero), the data field starts at byte 5 instead of byte 7.
3. Both positive or negative values fitting in the data fields are allowable. Negative values are in twos-complement form.
4. Some bits or bytes in the data fields are Reserved. The printer does not always check the contents of these fields. However, We recommend that such fields equal the specified value (if one exists) or zero.
5. The printer will not detect a condition where the specified command length (bytes 0 through 1) exceeds the actual number of bytes received. If this occurs, the printer will not process the command until the printer receives the specified number of bytes.
6. If the host wants to request the second buffer, the request must be the next command following the request for the first buffer of an acknowledgment. However, it is not required that the host request the second buffer of an acknowledgment.

Supported IPDS Command Codes for the 4247 Printer

Command	Hex Code	Description
SHS	D697	Set Home State
STM	D6E4	Sense Type and Model
NOP	D603	No Operation
LSS	D61E	Load Symbol Set
XOH	D68F	Execute Order Home State
XOA	D633	Execute Order Any State
BP	D6AF	Begin Page
EP	D6BF	End Page
LCC	D69F	Load Copy Control
LPD	D6CF	Logical Page Descriptor

Command	Hex Code	Description
LPP	D66D	Logical Page Position
WBCC	D680	Write Bar Code Control
WBC	D681	Write Bar Code
WGC	D684	Write Graphics Control
WG	D685	Write Graphics
WIC	D63D	Write Image Control
WI	D64D	Write Image
WT	D62D	Write Text
BO	D6DF	Begin Overlay
DO	D6EF	Deactivate Overlay
IO	D67D	Include Overlay
BPS	D65F	Begin Page Segment
DPS	D66F	Deactivate Page Segment
IPS	D67F	Include Page Segment
LE	D61D	Load Equivalence
LFE	D63F	Load Font Equivalence
DF	D64F	Deactivate Font
END	D65D	End

Command Function Sets

Function sets divide the printer commands into various categories. Each function set provides all the necessary controls for its functional area. These function sets are:

- Device Control function set
- Text function set
- Image function set
- Graphics function set
- Bar Code function set
- Overlay function set
- Page Segment function set
- Loaded Font function set.

Device Control Function Set Commands

The Device Control function set contains the commands the printer uses to set up the page, communicate device controls, and manage the Acknowledge protocol. The following commands are the device control function set:

Command	Hex Code	Description
NOP	D603	No Operation
STM	D6E4	Sense Type and Model
SHS	D697	Set Home State
ACK	D6FF	Acknowledge Reply
LFE	D63F	Load Font Equivalence
LCC	D69F	Load Copy Control

Command	Hex Code	Description
LPP	D66D	Logical Page Position
LPD	D6CF	Logical Page Descriptor
BP	D6AF	Begin Page
DF	D64F	Deactivate Font
EP	D6BF	End Page
END	D65D	End
XOH	D68F	Execute Order Home State
XOA	D633	Execute Order Any State

The following pages describe the device control function set commands in detail.

No Operation (NOP)

Length	D603	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

An NOP command is valid in any printer state. The printer does not perform any operation as a result of receiving this command. The printer ignores any data in this command.

Sense Type and Model (STM)

Length	D6E4	Flag	Correlation ID (Optional)
--------	------	------	---------------------------

This command is valid in any state. The Sense Type and Model command requests the printer to respond with device dependent information, which identifies the printer and the function it supports. The printer returns this information to the host application program in the Special Data (SD) portion of the Acknowledge Reply to the STM command.

Acknowledge Reply for Sense Type and Model

Length	D6FF	Flag	Correlation ID	Data
--------	------	------	----------------	------

The format of the data field returned with the Acknowledge Reply is: acknowledgment type, page/copy counters, and 6 bytes of general information, followed by a sequence of function set vectors identifying the functions supported by this printer. The following chart shows the Data field:

Decimal	Hex	Description
0	0	01 (Acknowledgment Type)
1-4	1-4	Page/Copy Counters
5	5	FF (System/370 Convention)
6-7	6-7	Printer Product Number 4247 (or 4230 or 4224 if printer is in emulation mode)
8	8	Printer Model Number (see note)
9-10	9-A	0000 (Reserved)
11-40	B-28	Device Control Function Set Vector
41-54	29-36	Text Function Set Vector
55-66	37-42	Image Function Set Vector

Decimal	Hex	Description
67-78	43-4E	Graphics Function Set Vector
79-84	4F-54	Page Segment Function Set Vector
85-92	55-5C	Overlay Function Set Vector
93-98	5D-62	Loaded Font Function Set Vector
99-110	63-6E	Bar Code Function Set Vector
Note: The format for byte 8, the printer model number, is "03 - Ethernet Host Interface"		

The function set vectors contain information relating to each specific command function set. The format of each function set vector group follows:

Device Control Function Set Vector

Decimal	Hex	Value	Description
11-12	B-C	001E	
13-14	D-E	C4C3	Device Control Function Set Identifier
15-16	F-10	FF10	DC/1 Level Identifier
17-18	11-12	8010	XOA, Activate Printer Alarm
19-20	13-14	80F2	XOA, Discard Buffered Data
21-22	15-16	80F4	XOA, Request Resource List
23-24	17-18	80F6	XOA, Exception Handling
25-26	19-1A	80F8	XOA, Print Quality Control
27-28	1B-1C	9005	XOH, Erase Print Data
29-30	1D-1E	9007	XOH, Erase Font Data
31-32	1F-20	900D	XOH, Stack Received Pages
33-34	21-22	9015	XOH, Select Input Media Source
35-36	23-24	9017	XOH, Set Media Size
37-38	25-26	F001	XOH, DSC Mode Persistent NACK Handling Supported
39-40	27-28	FF02	Three Byte Sense Data Supported

Text Function Set Vector

Decimal	Hex	Value	Description
41-42	29-2A	000E	Vector Length
43-44	2B-2C	D7E3	Composed Text Function Set Identifier
45-46	2D-2E	FF20	PT/2 Level Identifier
47-48	2F-30	1001	Unordered Text Supported
49-50	31-32	4020 (see note 1) 4000 (see note 2)	Limited Simulated Color Supported (see note 3)
51-52	33-34	5041	Text Orientation (2 for NLS)
53-54	35-36	1000	Optimum Performance if Text Data in Ordered Page

Notes:

1. 4247 native mode.
2. 4224 and 4230 emulation mode.
3. For Limited Simulated Color support, all valid but unsupported color values for text data are accepted and result in simulation of the specified colors without generation of unsupported color exceptions. In the 4247 Printer, simulation of Color of Medium is done by printing in Color of Medium, except where not possible because of different resolutions when text overlays graphics, image, or bar code. For actual colors, all valid colors not listed in the above table are simulated in the 4247 Printer by printing in black.

Image Function Set Vector

Decimal	Hex	Value	Description
55-56	37-38	000C	Vector Length
57-58	39-3A	C9D4	Image Function Set Identifier
59-60	3B-3C	FF10	IM/1 Level Identifier
61-62	3D-3E	1001	Unordered Image Blocks Supported
63-64	3F-40	4022	Limited Simulated Color and Color of Medium Supported
65-66	41-42	1000	Optimum Performance if Image Blocks in Ordered Page

Graphics Function Set Vector

Decimal	Hex	Value	Description
67-68	43-44	000C	Vector Length
69-70	45-46	E5C7	Graphics Function Set Identifier
71-72	47-48	FF20	GR/2 Level Identifier
73-74	49-4A	1001	Unordered Graphics Blocks Supported
75-76	4B-4C	4022	Limited Simulated Color and Color of Medium Supported
77-78	4D-4E	A080	Zero Degree (°) Orientation Supported

Page Segment Function Set Vector

Decimal	Hex	Value	Description
79-80	4F-50	0006	Vector Length
81-82	51-52	D7E2	Page Segment Function Set Identifier
83-84	53-54	FF10	Page Segment Function Set Level Identifier

Overlay Function Set Vector

Decimal	Hex	Value	Description
85-86	55-56	0008	Vector Length
87-88	57-58	D6D3	Overlay Function Set Identifier
89-90	59-5A	FF10	OL/1 Level Identifier
91-92	5B-5C	1505	5 Levels of Nested Overlays in Overlay State

Loaded Font Function Set Vector

Decimal	Hex	Value	Description
93-94	5D-5E	0006	Vector Length
95-96	5F-60	C3C6	Loaded Font Function Set Identifier
97-98	61-62	FF20	Symbol Sets

Bar Code Function Set Vector

Decimal	Hex	Value	Description
99-100	63-64	000C	Vector Length
101-102	65-66	C2C3	Bar Code Function Set Identifier
103-104	67-68	FF10	BC/1 Level Identifier
105-106	69-6A	1001	Unordered Bar Code Blocks Supported
107-108	6B-6C	4022 (see note 1) 4002 (see note 2)	Limited Simulated Color and Color of Medium Supported (see note 3)
109-110	6D-6E	A0C0	0°, 90° Orientation Supported

Notes:

1. 4247 native mode.
2. 4224 and 4230 emulation mode.
3. For Limited Simulated Color support, all valid but unsupported color values for text data are accepted and result in simulation of the specified colors without generation of unsupported color exceptions. In the 4247 Printer, simulation of Color of Medium is done by printing in Color of Medium, except where not possible because of different resolutions when text overlays graphics, image, or bar code. For actual colors, all valid colors not listed in the above table are simulated in the 4247 Printer by printing in black.

Set Home State (SHS)

Length	D697	Flag	Correlation ID (Optional)
--------	------	------	---------------------------

This command is valid in any state. When the printer receives the Set Home State command, the current page ends, all buffered data prints, and the printer returns to the home state. If the printer receives this command while already in the home state, the printer treats this command as a No Operation command.

Acknowledge Reply (ACK)

Length	D6FF	00	DATA
--------	------	----	------

or

Length	D6FF	40	Correlation ID	DATA
--------	------	----	----------------	------

The printer uses the Acknowledge Reply to return device status, sense information, and any additionally requested information back to the host application program. The application program uses the Acknowledge data to maintain control of the printing application and to begin error recovery actions when necessary. The printer sends an acknowledgment:

- Whenever the acknowledgment required bit in the flag byte is on

- Whenever the printer detects a command stream error or device error and a negative response must be sent.

A negative response has priority over a positive response.

If the printer can identify the command and the command has a correlation ID, the Acknowledge Reply contains a correlation ID that matches the command.

The maximum length of this command is 255 bytes. If there is a five-byte command header (no correlation ID present), the data field can be up to 250 bytes long. If a correlation ID is present in the header, the maximum data field length is 248 bytes. The Acknowledge Reply data field contains the acknowledgment type, page/copy counters, and a Special Data (SD) area. The printer loads the Special Data area with the appropriate data when one of the following occurs:

1. The printer receives one of the following information request commands:
 - Sense Type and Model
 - Obtain Printer Characteristics
 - Request Resource List.
2. An error occurs. Under this condition, the printer loads the special data area with the sense bytes and sends a negative acknowledgment (NACK) to the host.

The format of the Acknowledge Reply data field follows:

Decimal	Hex	Value	Description
0	0	00 01 04 06 80	Acknowledgement Type Positive - No Special Data (SD) Positive - Sense Type/Model (STM) Data in SD Positive - Request Resource List (RRL) in SD Positive - Obtain Printer Characteristics (OPC) in SD Negative - Sense Bytes in SD
1-4	1-4	XX...XX	
5- <i>n</i>	5- <i>n</i>	XX...XX	

Load Font Equivalence (LFE)

Length	D63F	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

The Load Font Equivalence command maps font identifiers. The fonts do not have to exist in the printer when the printer receives this command.

In the home state, this command creates a new font equivalence record that completely replaces the current LFE record. In the page state:

- The font equivalence entries in this command add to the current LFE entries, or
- If identical local font identifiers (byte 1) exist, this command overlays the current LFE entries.

In the page segment or overlay state, a received LFE is stored as part of the page segment or overlay, and it does not process until the Include Page Segment or Include Overlay command is received.

The font equivalences for a given page are those that are in effect when the Begin Page command processes plus those added in the page state. There is a maximum of 20 different loaded font ID/print quality combinations defined in home or page state. Page segments use the font equivalence tables active at the time the Include Page Segment command processes. In addition, the LFEs that were stored as part

of the page segment add to the font equivalence tables during the include page segment process up to a maximum of 20 loaded font ID/print quality combinations.

Each Begin Overlay command starts the overlay with the loaded font IDs currently defined and will add its LFE entries during the overlay's definition up to a maximum of 20 loaded font ID/print quality combinations total. On a logical page, the sum of each included overlay's number of loaded font ID/print quality combinations (whether included through Include Overlay or through Load Copy Control commands) added to the number of loaded font ID/print quality combinations on the logical page cannot exceed 58.

Each font equivalence entry is 16 bytes, in the following format:

Decimal	Hex	Value	Description
0	0	00-FE FF	Local Font ID Reserved (4248 mode) (See Note 4)
1-2	1-2	0001 - 7EFF	Font Host Assigned ID (See Note 3)
3-4	3-4		Font Inline Sequence (Ignored)
5-6	5-6	0000	Reserved
7-8	7-8	XXXX FFFF	Code Page ID (See Code Page ID Chart) Use the Printer Defined Default Code Page ID
9-10	9-A	XXXX FFFF	Font (Style) ID (See Font ID Chart) Use the Printer Defined Default Font
11-12	B-C	0000	Reserved
13	D	00	Reserved
14	E	Bit 0 Bit 1-2 Bit 3 Bit 4 Bit 5 Bit 6 Bit 7	Font Attributes Font Is Present in Printer (See Notes 1 and 2) Reserved Double High (See Notes 5 and 6) Italicized Print (See Note 6) Double Strike Bold Double Wide
15	F	00	Reserved (See Note 2)

Notes:

1. If the Font Present in Printer bit is on, this indicates to the printer that the font has previously been downloaded or is permanently resident. If this bit is off, this indicates to the printer that the font is not present in the printer and will, presumably, be downloaded (by an LSS command) prior to selection for printing.
2. Additional font equivalence entries, each 16 bytes long, can follow this entry, using the same format. No more than 20 different loaded font ID/print quality combinations can be active at a given time.
3. Use the same Loaded Font ID when using the same Font ID and Code Page ID for several Local IDs. This saves storage space and font allocation time in the printer.
4. Local ID byte 0 may use any value 1 to FE. A value of FF is supported if the printer is in 4224 Emulation Mode for compatibility, but is not recommended. See "Set Character Set" on page 167, "Logical Page Descriptor (LPD)" on page 111, and "Printer Initialization and Preparation Sequence" on page 93 for more information regarding Local IDs equal to FF.
5. A double high font can be printed only on a page that is unordered. See "Logical Page Descriptor (LPD)" on page 111 for more information.

6. A font cannot be both double high and italicized.

Code Page ID Values

Hex Value	Code Page	Hex Value	Code Page
0025	USA/Canada	01A4	Arabic
0100	International Set 1	01A7	Greek
0104	Canadian French	01A8	Hebrew
0111	Austria/Germany	01B5	PC Character Sets 1 and 2
0112	Belgium	01F4	International Set 1
0113	Brazil	0323	Hebrew (old)
0115	Denmark/Norway	033F	Portugal (Alternate)
0116	Finland/Sweden	0341	Korean
0118	Italy	0346	Thai
0119	Japan (English)	0366	Latin 2/ROECE
011A	Portugal	0367	Icelandic
011C	Spain/Latin America	036B	Greek (Old)
011D	United Kingdom	0373	Cyrillic (Old)
011E	Austria/Germany (Alternate)	037A	Yugoslav
011F	Denmark/Norway (Alternate)	037C	OCR-A (NLQ Only)
0120	Finland/Sweden (Alternate)	037D	OCR-B NLQ Only)
0121	Spain (Alternate)	03EA	DCF Compatibility
0122	Japan/Katakana	0401	Cyrillic Multilingual
0125	APL (4224 Compatibility)	0402	Turkish
0129	France	0449	Farsi
0136	APL	0458	Baltic Multilingual
0462	Estonian	0154	OCR (4224 Compatibility) NLQ only
1149	euro 924		

Font ID Values

Hex Value	Font ID	Hex Value	Font ID
001A	10 CPI, Gothic (Fast Draft and DP Quality)	00A0	Proportional spacing, Gothic (DP Text and NLQ)
000B	10 CPI, Courier (DP Text and NLQ)	00DE	15 CPI, Gothic (Fast Draft and DP Quality)
0013	10 CPI, OCR-A (NLQ)	00DF	15 CPI Courier (DP Text and NLQ)
0003	10 CPI, OCR-B (NLQ)	0190	16.7 CPI Gothic (Fast Draft and DP Quality)
0055	12 CPI, Courier (DP Text and NLQ)	0057	12 CPI, Gothic (Fast Draft and DP Quality)

Notes:

1. The Graphic Character Set Global (GCSGID) portion of the Global Font ID is ignored by the printer.
2. All combinations of CPGID and FGID are valid with the following exceptions:
 - OCR-A Code Page and FGID 0013 are only valid in combination together.
 - OCR-B Code Page and FGID 0003 are only valid in combination together.
 - The following Code Pages are not available with FGID X'00A0' (PSM)

- Code Page 290 Katakana
- Code Page 293 APL (4224)
- Code Page 310 APL
- Code Page 420 Arabic
- Code Page 833 Korean
- Code Page 838 Thai
- Code Page 880 Cyrillic (Old)
- Code Page 1002 DCF Compatibility
- Code Page 1025 Cyrillic Multilingual
- Code Page 1097 Farsi

Load Copy Control (LCC)

Length	D69F	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

The Load Copy Control command controls the production of output from subsequently received input logical pages. The LCC command is only valid while the printer is in the home state. This command remains in effect until the printer receives the next LCC.

The format of the data field (DATA) for this command is:

Decimal	Hex	Value	Description
0	0	02-24	Copy Subgroup Count (See Note 1)
1	1	01	Number of Copies
2- <i>n</i>	2- <i>n</i>	XXXX	Copy Modification (See Description) C100 = Simplex D101 - D1FF = Suppression ID E101 - E1FE = Overlay ID

Notes:

1. Group Count is the number of bytes in this group definition entry. Valid ranges are from 2 to 36 (X'02' to X'24') in units of 2.
2. Subsequent LCC commands nullify previous Overlay IDs or Suppression IDs from previous LCC commands.

Copy Modification is an optional modification keyword list made up of two byte controls:

- The first byte is the keyword.
- The second byte is the associated parameter for this keyword.

Valid values for copy modification are:

- C100 - Simplex Printing
- D101 to D1FF - Suppression ID
- E101 to E1FE - Overlay ID.

Simplex Printing is printing on only one side of the document. This is the only type of printing the 4247 Printer can perform.

Suppression ID allows the later suppression of text data. The first byte of the keyword, D1, specifies this keyword as suppression. The second byte of the keyword specifies a suppression identifier. Valid suppression ID values are 01 to FF. Print suppression occurs as follows:

1. The LCC command specifies one or more suppression ID values. (Each ID must begin with the keyword - D1.)

2. The printer receives a Begin Suppression control (inside a Write Text command) with a suppression ID that matches a value in the LCC command.
3. All subsequent text data does not print (text suppression), until the printer receives an End Suppression control (inside a Write Text command) with the same ID.
4. All text data received after the End Suppression control prints normally.

Overlay ID allows later processing of specified overlays. The first byte of the keyword, E1, specifies this keyword as overlay. The second byte of the keyword specifies an overlay identifier. Valid overlay ID values are 01 to FE. An overlay processes as follows:

1. The LCC command specifies one or more overlay ID values. (Each ID must begin with the keyword - E1.)
2. The previously stored overlay with this specified identifier merges onto the following page at its reference corner.

Logical Page Descriptor (LPD)

Length	D6CF	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

This command establishes the print characteristics for the logical page. The Logical Page Descriptor command is only valid in the home state. See “Set Media Size (SMS)” on page 115 for physical medium size information.

The format of the data field (DATA) for this command is:

Decimal	Hex	Value	Description
0	0	00	Units Base Value Equals 10 in.
1	1	00	Reserved
2-3	2-3	05AD-7FFF	X Units Per Unit Base Value
4-5	4-5	05A0-7FFF	Y Units Per Unit Base Value
6	6	00	Reserved
7-9	7-9	000001 - 007FFF (See Note 1)	Width of Page in Units
10	A	00	Reserved
11-13	B-D	000001 - 007FFF (See Note 1)	Length of Page in Units
14	E	00	Reserved
15	F		Ordered Page Flag (See Note 2)
Bit 0	Bit 0	0	Unordered Page
		1	Ordered Page
Bits 1-7	Bits 1-7		Reserved
16-17	10-11	0000	Reserved
18-21	12-15	00000000	Reserved
22-23	16-17	0000	Reserved

Decimal	Hex	Value	Description
24-25	18-19	0000	I-Axis Orientation of 0 Degrees
		5A00	I-Axis Orientation of 180 Degrees (See Note 5)
		FFFF	Printer Default (0 Degrees) (See Note 3)
26-27	1A-1B	2D00	B-Axis Orientation of 90 Degrees
		FFFF	Printer Default (90 Degrees)
29-29	1C-1D	0000-FFFF	Initial I Displacement in Units (See Note 4)
30-31	1E-1F	0000-FFFF	Initial B Displacement in Units
32-33	20-21	0000-FFFF	Initial Inline Margin in Units
		FFFF	Printer Default (Use Initialization Value) (See Note 4)
34-35	22-23	0000	Intercharacter Increment
		0000-7FFF	Printer Default (Use Initialization Value)
36-37	24-25	0000	Reserved
38-39	26-27	0000-7FFF	Baseline Increment
		FFFF	Printer Default (Use Initialization Value)
40	28	00-FE	Local Font ID
		FF	Printer Default (Use Initialization Value)
41-42	29-2A	0000	Printer Default (Black)
		0008	Black
		FF00	Printer Default (Black)
		FF07	Printer Default (Black)
		FFFF	Printer Default (Black)

Notes:

1. The LPD command accepts logical page values from 0001 to 7FFF for this parameter. However, attempts to print outside the intersection of the physical medium (as defined by the Set Media Size command) and the logical page result in an error.
2. If the Ordered Page Flag is on, this indicates to the printer that subsequent data is in order and can print as it is received. If page data is unordered, printing is deferred (buffered), because the printer must place the received data in the proper sequence.
3. The high-order 9 bits of the two byte fields 18-19 and 1A-1B are interpreted as a 9-bit binary value that describes the orientation of the X and Y axes.
4. If bytes 1C-1D and bytes 20-21 are all 0, each line begins at the leftmost print position for 0, 90 orientation and rightmost print position for 180, 90 orientation.
5. The 4247 Printer can print right-to-left by selecting a 180, 90 degree orientation within the Load Page Descriptor command or within the Set Text Orientation control sequence. The 4247 Printer forces an inline sequence of 180 degrees for the default font to maintain upright printing when right-to-left printing is selected.

Figure 12 on page 113 shows how the Logical Page Descriptor command defines the logical page.

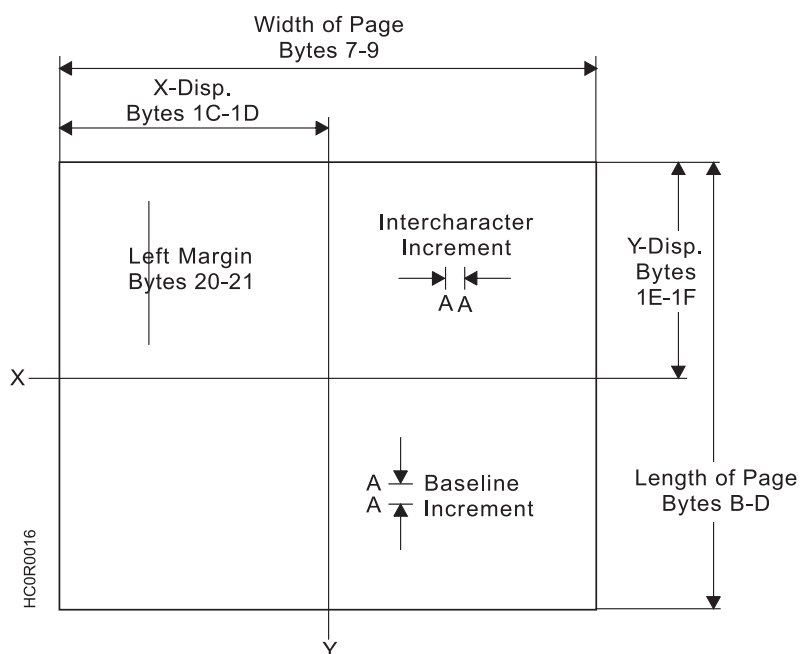


Figure 12. Using the Load Page Descriptor Command to Specify the Logical Page

Logical Page Position (LPP)

Length	D66D	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

This command positions the upper left corner of the logical page (defined by the Logical Page Descriptor control) with respect to the physical medium. The Logical Page Position command is only valid in the home state.

Figure 13 shows the LPP command positioning the logical page on the physical medium.

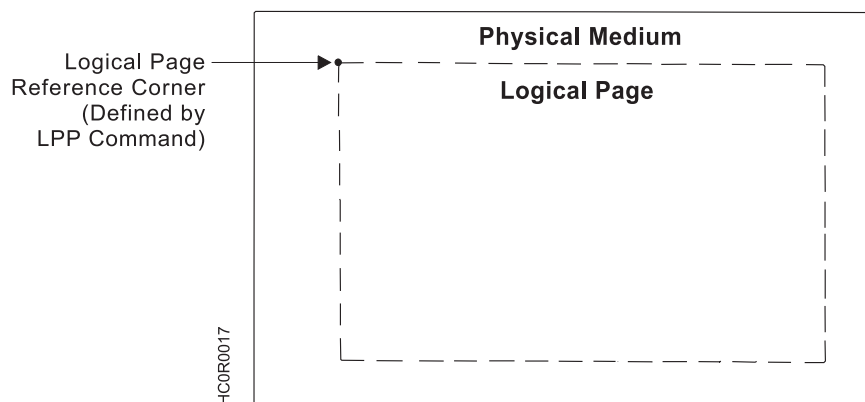


Figure 13. Using the Logical Page Position Command to Position

The physical medium dimensions do not change. The X and Y coordinates of the LPP command specify the location of the Logical Page Reference Corner relative to the corresponding corner of the physical medium. These coordinates are expressed in terms of the units in effect at the time the LPP command is received.

Only positive values are valid for the data field. The format of the data field (DATA) for this command is:

Decimal	Hex	Value	Description
0	0	00	Reserved
1-3	1-3	000000-007FFF	X Displacement
4	4	00	Reserved
5-7	5-7	000000-007FFF	Y Displacement
8-9	8-9	0000	Reserved

Deactivate Font (DF)

Length	D64F	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

The Deactivate Font command provides a means for the control unit to delete one or more fonts from the printer. The DATA field contains the following information:

End Page (EP)

Length	D6BF	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

This command causes the printer to return to the home state from the page, page segment, or overlay state. If the printer is in the page state, the printer completes any deferred printing for the current page and advances the forms to the top of the next page. Zero or more bytes of data may be transmitted with this command but are ignored.

End (END)

Length	D65D	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

The End command is the ending control for a graphics block, image block, or bar code block state. This command completes a series of write image, write graphics, or write bar code commands. This command does not transmit any data. At the completion of this command, the printer leaves the block state and returns to the page, overlay, or page segment state.

Execute Order Home State (XOH)

Length	D68D	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

Subcommand	Subcommand Data
------------	-----------------

The Execute Order Home State command identifies a set of subcommands (orders) for formatting physical mediums of data, printing groups of physical mediums, and managing the fonts, page segments, and overlays. This command is only valid while the printer is in the home state.

The data field contains a two byte order, called the subcommand, and a subcommand data field. There is only one subcommand for a single XOH command. The subcommand data field contains parameters for that order.

The valid orders for the XOH command for the 4247 Printer are:

Order	Description
0100	Print Buffered Data (PBD)
0500	Erase Residual Print Data (ERPD)
0700	Erase Residual Font Data (ERFD)
0D00	Stack Received Pages (SRP)
1500	Select Input Media Source (SIMS)
1700	Set Media Size (SMS)
F300	Obtain Printer Characteristics (OPC)

Print Buffered Data (PBD)

This subcommand causes the printer to print all buffered data pages prior to sending the Acknowledgment Reply, if requested. The print buffer clears at the completion of this command.

Erase Residual Print Data (ERPD)

This is a data security and privacy order. This order causes the printer to first complete a Print Buffered Data order, then delete all page segments, overlays, and buffered page data (text, image, graphics, and bar codes) from the printer storage.

Erase Residual Font Data (ERFD)

This is a data security and privacy order. This order causes the printer to first complete a Print Buffered Data order, then delete all font information from the printer storage.

Stack Received Pages (SRP)

This command is a synchronizing command. It is accepted by the 4247 Printer, but it is functionally a no-op because of the simple paper path.

Select Input Media Source (SIMS)

The Select Input Media Source (SIMS) subcommand selects an input media source ID and indirectly selects the input for subsequent sheets. This subcommand applies to the sheet that the next received page is printed on.

The size of the input media can be specified *explicitly* by the Set Media Size command or *implicitly* by the assumptions the printer makes about the size of the media in the input media source selected by this subcommand.

The set of valid Media Source ID values depend on what paper sources are currently installed. The following tables give the valid values for the configurations described in each table.

If the printer is in 4247 mode or an emulation mode with one or two tractors installed, valid values are:

Table 5. Front and Rear with no linking

Bytes 0-1	X'1500'	Select Input Media Source Order Code
Byte 2	X'00'	Front Paper Source
	X'01'	Rear Paper Source (if configured)
	X'FF'	Printer Default Bin

Set Media Size (SMS)

The Set Media Size subcommand specifies the size of the physical medium.

Refer to your printer's *User's Guide* for information on setting operator media size input.

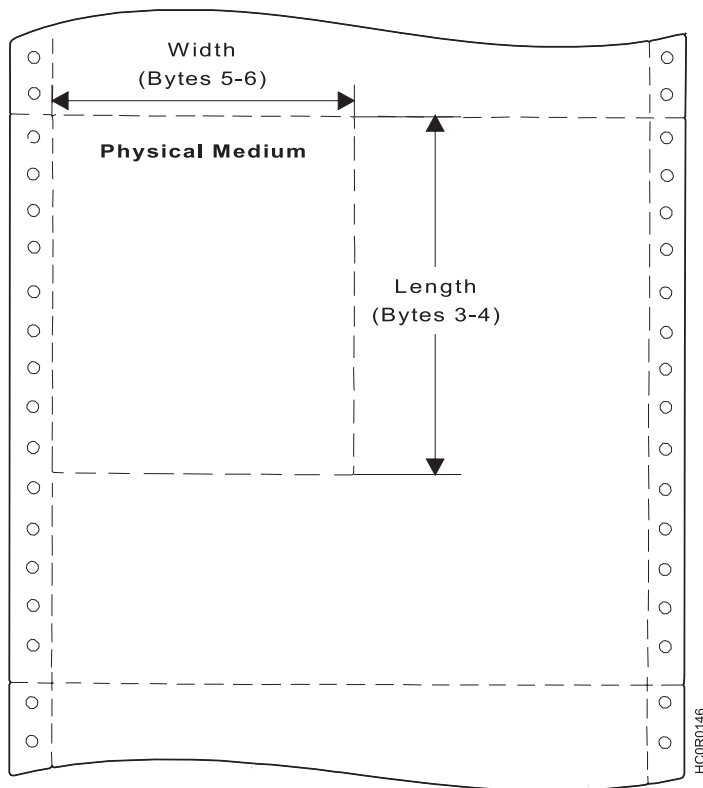


Figure 14. Using the Set Media Size Command to Specify the Physical Medium

The data field for the Set Media Size subcommand has the following format:

Decimal	Hex	Value	Description
0	0	00	Unit Base (10 in.)
		01	Unit Base (10 cm.)
1-2	1-2	5A0-7FFF	Units per Base Value (per 10 in.)
		1626-7FFF	Units per Base Value (per 10 cm)
3-4	3-4	000A-4A40	X-Extent of the Physical Medium in Units
		FFFF	Use Current MPP
5-6	5-6	000A-7FFF	Y-Extent of the Physical Medium in Units
		FFFF	Use Current MPL

Obtain Printer Characteristics (OPC)

This subcommand is a host request for information about the current printer environment characteristics. The printer responds by placing the requested information in the Special Data (SD) area of a subsequent Acknowledge Reply. The printer reply is a series of self-defining fields describing the printer characteristics. The OPC data is returned in more than one response buffer. The self-defining fields contain specific information about the printer characteristics. If the ARQ flag was not set on for the XOH command containing this order, then this order is equivalent to a No Operation.

Acknowledge Reply for Obtain Printer Characteristics:

Length	D6FF	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

The following charts describe the self-defining data fields.

Acknowledge Type and Counters:

Decimal	Hex	Value	Description
0	0	06	Acknowledgement Type (4 byte)
1-4	1-4	XXXXXXXX	Page/Copy Counters

Printable Area Self-Defining Field: The page extents are set at initialization time to reflect the operator panel settings. The Set Media Size command can change the page extents. For 4247 mode and all emulation modes with one or two tractors installed:

Decimal	Hex	Value	Description
0-1	0-1	0018	Length of this Field
2-3	2-3	0001	Printable Area ID
4	4	00 01	Media Source ID (See notes) Front Continuous Forms Rear Continuous Form
5	5	00	Reserved
6	6	00	00 Unit Base (10 in.)
7	7	00	Reserved
8-9	8-9	3840	Units per Base Value (Decimal 14400 per 10 in.)
10-11	A-B	XXXX	Current Forms X-Extent
12-13	C-D	XXXX	Current Forms Y-Extent
14-15	E-F	0000	Printable Area X-Offset
16-17	10-11	0000	Printable Area Y-Offset
18-19	12-13	XXXX	Printable Area X-Extent (from Page Extent)
20-21	14-15	XXXX	Printable Area Y-Extent from Page Extent
22-23	16-17	XX00 Bit 0 Bit 1,2 Bit 3 Bit 4 Bit 5 Bit 6 Bit 7	Input Media Source Characteristics 0 =No Duplex 01=Continuous Forms 1 =Media Source Available 0 =Reserved (Always 0) 0 =Reserved (Always 0) 0 =Reserved (Always 0) 0 =Reserved (Always 0)

Note: The Printable Area Self-Defining Field is returned once for each installed media source; that is, front and rear tractor.

Symbol-Set Support Self-Defining Field:

Decimal	Hex	Value	Description
0-1	0-1	0046	Length of this field
2-3	2-3	0002	Symbol Set Support ID
4	4	10	Length of Self-Defining Parameter
5	5	01	Fixed Box Size Support (Fixed Pitch NLQ)

Decimal	Hex	Value	Description
6	6	14	X-Box Size in Pels (20)
7	7	12	Y-Box Size in Pels (18)
8	8	00	Reserved
9	9	02	Repeating Group Length
10-11	A-B	000B	10 CPI Courier (NLQ)
12-13	C-D	0055	12 CPI Courier (NLQ)
14-15	E-F	00DF	15 CPI Courier (NLQ)
16-17	10-11	0013	10 CPI OCR-A (NLQ)
18-19	12-13	0003	10 CPI OCR-B (NLQ)
20	14	0C	Length of Self Defining Parameter
21	15	01	Fixed Box Size Support (Fixed Pitch DP Text)
22	16	14	X-Box Size in Pels (20)
23	17	09	Y-Box Size in Pels (9)
24	18	00	Reserved
25	19	02	Repeating Group Length
26-27	1A-1B	000B	10 CPI Courier (DP Text)
28-29	1C-1D	0055	12 CPI Courier (DP Text)
30-31	1E-1F	00DF	15 CPI Courier (DP Text)
32	20	0E	Length of Self Defining Parameter
33	21	01	Fixed Box Size Support (Fixed Pitch DP Text)
34	22	A0	X-Box Size in Pels (20)
35	23	09	Y-Box Size in Pels (9)
36	24	00	Reserved
37	25	02	Repeating Group Length
38-39	26-27	001A	10 CPI Gothic (DP)
40-41	28-29	0057	12 CPI Gothic (DP)
42-43	2A-2B	00DE	15 CPI Gothic (DP)
44-45	2C-2D	0190	16.7 CPI Gothic (DP)
46	2E	0C	Length of Self Defining Parameter
47	2F	02	Variable Box Size Support (PSM NLQ)
48	30	00	Unit Base (10 in.)
49	31	00	Reserved
50-51	32-33	0960	Units per Unit Base (2400)
52	34	FF	Maximum X-Box Size in Pels (255)
53	35	12	Y-Box Size in Pels (18)
54	36	00	Reserved
55	37	02	Repeating Group Length
56-57	38-39	00A0	PSM Essay (NLQ)
58	3A	0C	Length of Self-Defining Parameter
59	3B	02	Variable Box Size Support (PSM DP Text)
60	3C	00	Unit Base (10 in.)

Decimal	Hex	Value	Description
61	3D	00	Reserved
62-63	3E-3F	0960	Units per Unit Base (2400)
64	40	FF	Maximum X-Box Size in Pels (255)
65	41	09	Y-Box Size in Pels (9)
66	42	00	Reserved
67	43	02	Repeating Group Length
67-68	44-45	00A0	PSM Essay (DP Text)

Image/Coded-Font Self-Defining Field:

Decimal	Hex	Value	Description
0-1	0-1	000A	Length of this field
2-3	2-3	0003	Image/Coded-Font Resolution ID
4	4	00	Unit Base (10 in.)
5	5	00	Reserved
6-7	6-7	05A0	X Pels per Base Value (Decimal 1440 per 10 in.)
8-9	8-9	05A0	Y Pels per Base Value (Decimal 1440 per 10 in.)

Storage Pools Self-Defining Field:

Decimal	Hex	Value	Description
0-1	0-1	000F	Length of this field
2-3	2-3	0004	Storage Pools ID
4	4	0B	Length of Self-Defining Parameter
5	5	01	Triplet ID
6	6	00	Storage Pool ID
7-10	7-A	0006D000	Size of Storage Pool when empty
11-14	B-E	00000000	Reserved

Foreground Color Support Self-Defining Field:

Decimal	Hex	Value	Description
0-1	0-1	0006	Length of this field
2-3	2-3	0005	Foreground Color
4-5	4-5	0008	Black Ribbon

Installed Features Self-Defining Field:

Decimal	Hex	Value	Description
0-1	0-1	0006	Length of this field
2-3	2-3	0006	Installed Features ID
4-5	4-5	0B00	Continuous Forms Output

Available Features Self-Defining Field:

Decimal	Hex	Value	Description
0-1	0-1	0006	Length of this field
2-3	2-3	0007	Available Features
4-5	4-5	0B00	Continuous Forms Output

Resident-Symbol Set Support Self-Defining Field: For Ethernet interfaces:

Decimal	Hex	Value	Description
0-1	0-1	00B6	Length of this field
2-3	2-3	0008	Resident Symbol Set Support
4	4	6A	Length of this field
5	5	01	Code Page Support
6	6	56	Length of Code Page List
7	7	02	Length of CP Repeating Group Entry
8-9	8-9	01A7	CP423 Greek (Old)
10-11	A-B	01A8	CP424 Hebrew (New)
12-13	C-D	01B5	CP437 PC Extended
14-15	E-F	0323	CP089 Hebrew (Old)
16-17	10-11	0366	CP870 Latin 2/ROECE
18-19	12-13	0367	CP871 Icelandic
20-21	14-15	036B	CP875 Greek (New)
22-23	16-17	0402	CP1026 Turkish
24-25	18-19	0100	CP256 International #1
26-27	1A-1B	01F4	CP500 International #2
28-29	1C-1D	0025	CP037 USA/Canada
30-31	1E-1F	0104	CP260 Canadian French
32-33	20-21	0111	CP273 Austrian/German
34-35	22-23	0112	CP274 Belgian
36-37	24-25	0113	CP275 Brazilian
38-39	26-27	0115	CP277 Danish/Norwegian
40-41	28-29	0116	CP278 Finnish/Swedish
42-43	2A-2B	0118	CP280 Italian
44-45	2C-2D	0119	CP281 Japanese English
46-47	2E-2F	011A	CP282 Portuguese
48-49	30-31	011C	CP284 Spanish and Spanish-Speaking
50-51	32-33	011D	CP285 English (UK)
52-53	34-35	0129	CP297 French (Alternate)
54-55	36-37	011E	CP286 Austrian/German (Alternate)
56-57	38-39	0121	CP289 Spanish (Alternate)
58-59	3A-3B	0120	CP288 Finnish/Swedish (Alternate)
60-61	3C-3D	011F	CP287 Danish/Norwegian (Alternate)

Decimal	Hex	Value	Description
62-63	3E-3F	033F	CP831 Portuguese (Alternate)
64-65	40-41	037A	CP890 Yugoslav
66-67	42-43	0458	CP1112 Baltic Multilingual
68-69	44-45	0462	CP1122 Estonian
70-71	46-47	0474	CP1140 USA/Canada + euro
72-73	48-49	0475	CP1141 Austrian/German + euro
74-75	4A-4B	0476	CP1142 Danish/Norwegian +euro
76-77	4C-4D	0477	CP1143 Finnish/Swedish + euro
78-79	4E-4F	0478	CP1144 Italian + euro
80-81	50-51	0479	CP1145 Spanish/Spanish Speaking + euro
82-83	52-53	047A	CP1146 English UK + euro
84-85	54-55	047B	CP1147 French + euro
86-87	56-57	047C	CP1148 International 5 / Belgian New + euro
88-89	58-59	047D	CP1149 Icelandic + euro
90-91	5A-5B	039C	CP924 Latin 9 ISO 8859 +euro
92	5C	12	Length of Font ID List
93	5D	02	Length of Font ID Repeating Group Entry
94-95	5E-5F	000B	10 CPI Courier (DP Text and NLQ)
96-97	60-61	0055	12 CPI Courier (DP Text and NLQ)
98-99	62-63	00DF	15 CPI Courier (DP Text and NLQ)
100-101	64-65	001A	10 CPI Gothic (Fast Draft and DP)
102-103	66-67	0057	12 CPI Gothic (Fast Draft and DP)
104-105	68-69	00DE	15 CPI Gothic (Fast Draft and DP)
106-107	6A-6B	0190	16.7 CPI Gothic (Fast Draft and DP)
108-109	6C-6D	00A0	PSM ESSAY (DP Text and NLQ)
110	6E	28	Total Length of CP List
111	6F	01	CP Support
112	70	16	Length of CP List
113	71	02	Length of CP Repeating Group Entry
114-115	72-73	0122	CP290 Japanese Katakana
116-117	74-75	01A4	CP420 Arabic
118-119	76-77	0346	CP838 Thai
120-121	78-79	0370	CP880 Cyrillic (Old)
122-123	7A-7B	0401	CP1025 Cyrillic Multinational
124-125	7C-7D	03EA	CP1002 DCF Compatibility (Release 2)
126-127	7E-7F	0125	CP293 APL (4224 Compatibility)
128-129	80-81	0136	CP310 APL
130-131	82-83	0341	CP833 Korean
132-133	84-85	0449	CP1097 Farsi
134	86	10	Length of Font ID List
135	87	02	Length of Font ID Repeating Group Entry

Decimal	Hex	Value	Description
136-137	88-89	000B	10 CPI Courier (DP Text and NLQ)
138-139	8A-8B	0055	12 CPI Courier (DP Text and NLQ)
140-141	8C-8D	00DF	15 CPI Courier (DP Text and NLQ)
142-143	8E-8F	001A	10 CPI Gothic (Fast Draft and DP)
144-145	90-91	0057	12 CPI Gothic (Fast Draft and DP)
146-147	92-93	00DE	15 CPI Gothic (Fast Draft and DP)
148-149	94-95	0190	16.7 CPI Gothic (Fast Draft and DP)
150	96	0C	Total Length of CP List
151	97	01	CP Support
152	98	04	Length of CP List
153	99	02	Length of CP Repeating Group Entry
154-155	9A-9B	0154	CP 340,OCR (4224 compatibility)
156	9C	06	Length of Font ID List
157	9D	02	Length of Font ID Repeating Group Entry
158-159	9E-9F	0013	OCR-B Quality
160-161	A0-A1	0003	OCR-A Quality
162	A2	0A	Total Length of CP List
163	A3	01	CP Support
164	A4	04	Length of CP List
165	A5	02	Length of CP Repeating Group Entry
166-167	A6-A7	037C	CP 892,OCR-A
168	A8	04	Length of Font ID List
169	A9	01	Length of Font ID Repeating Group Entry
170-171	AA-AB	0013	OCR-A Quality
172	AC	0A	Total Length of CP List
173	AD	01	CP Support
174	AE	04	Length of CP List
175	AF	02	Length of CP Repeating Group Entry
176-177	B0-B1	037D	CP 893,OCR-B
178	B2	04	Length of Font ID List
179	B3	02	Length of Font ID Repeating Group Entry
180-181	B4-B5	0003	OCR-B Quality

Print Quality Support Self-Defining Field: These values apply if Host Fast Draft is **disabled** in the printer configuration menu:

Note: Host Fast Draft is only available for the 4247 Z03 printer model.

Decimal	Hex	Value	Description
0-1	0-1	0007	Length of this field
2-3	2-3	0009	Print Quality ID
4	4	01	DP Quality

Decimal	Hex	Value	Description
5	5	56	DP Text Quality
6	6	AB	NLQ

These values apply if Host Fast Draft is **enabled** in the printer configuration menu:

Decimal	Hex	Value	Description
0-1	0-1	0008	Length of this field
2-3	2-3	0009	Print Quality ID
4	4	01	Fast Draft Quality
5	5	2B	DP Quality
6	6	56	DP Text Quality
7	7	AB	NLQ

XOA RRL RT & RIDF Support Self-Defining Field:

Decimal	Hex	Value	Description
0-1	0-1	0006	Length
2-3	2-3	000A	RRL Resource Type Self Defining Field
4-5	4-5	FF00	All Resources as Host Assigned Resource ID

Common Bar Code Type Self-Defining Field:

Decimal	Hex	Value	Description
0-1	0-1	0007	Length of this field
2-3	2-3	000E	RRL Resource Type Self Defining Field
4	4	0D	Codabar Modifier Byte Options X'01' and X'02'
5	5	11	Code 128 Modifier Byte Options X'02'
6	6	18	POSTNET Modifier Byte Options X'00' - X'03'

Product Identifier Self-Defining Field: If the printer is in 4247 native or 4230 Emulation Mode:

Decimal	Hex	Value	Description
0-1	0-1	003C	Length
2-3	2-3	0013	Product Identifier
4	4	38	Length of this ID
5-6	5-6	0001	4247 with Page Counter Fix ID
7-12	7-C	F0F0F4F2F4F7	Device Type
13-15	D-F	E5F0F3	Model Number
16-18	10-12	C9C2D4	Manufacturer
19-20	13-14	F0F1	Plant of Manufacture
21-32	15-20	XX...XX	Sequence Number
33-34	21-22	0000	Tag
35-43	23-2B	XX...XX	EC Level

Decimal	Hex	Value	Description
44-59	2C-3B	XX...XX	Device Specific

If the printer is in 4224 emulation mode:

Decimal	Hex	Value	Description
0-1	0-1	003F	Length
2-3	2-3	0013	Product Identifier
4	4	03	Length of this Field
5-6	5-6	0000	4224 with Page Counter Fix ID
7	7	38	Length of this Field
8-9	8-9	0001	4224 Product Identifier Parameter ID
10-15	A-F	F0F0F4F2F4F7	Device Type
16-18	10-12	E5F0F3	Model Number
19-21	13-15	C9C2D4	Manufacturer
22-23	16-17	F0F1	Plant of Manufacture
24-35	18-23	XX...XX	Sequence Number
36-37	24-25	0000	Tag
38-46	26-2E	XX...XX	EC Level
47-62	2F-3E	XX...XX	Device Specific

Execute Order Any State (XOA)

Length	D633	Flag	Correlation ID (Optional)	DATA
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Subcommand	Subcommand Data
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The Execute Order Any State command identifies a set of subcommands (orders) that take effect immediately, regardless of the current printer command state. This command is valid in any state.

Each data field contains a two byte order (subcommand), followed by a zero or more bytes of parameters for that order. There is only one subcommand for a single XOA command.

The valid orders for the XOA command are:

Order	Description
1000	Activate Printer Alarm (APA)
F200	Discard Buffered Data (DBD)
F400	Request Resource List (RRL)
F600	Exception Handling Control (EHC)
F800	Print Quality Control (PQC)

Activate Printer Alarm (APA)

The XOA Activate Printer Alarm (APA) subcommand signals the printer to activate the alarm mechanism. As long as the printer's alarm function is enabled, the alarm will be turned on in response to this command. It will remain on until Stop is pressed.

After processing this command, the printer continues to process the incoming IPDS data stream. If synchronization of actions is desired, the application must ensure if the appropriate commands are sent to the printer.

Discard Buffered Data (DBD)

The XOA Discard Buffered Data (DBD) subcommand deletes all buffered data from the printer storage and returns the printer to home state. Any data currently being received is deleted. If this order is syntactically correct, no exceptions can result from its execution. The DBD order does not affect completely received resources, such as fonts, page segments, and overlays; however, if the printer is in any resource state, the printer deletes the partial resource before returning to home state. If the printer is in Ordered Page Mode, the subcommand prints all buffered data to the point of the command, does a page eject, and returns to Home State.

The DBD order is a *synchronizing* command. Any command following a synchronizing command is not processed until all preceding commands have been completely processed. Also, the ACK of the DBD order is not returned until DBD processing is complete.

Request Resource List (RRL)

This subcommand is a request from the host application program for the printer to identify resources currently allocated in the printer. The printer responds by placing the requested information in the Special Data (SD) area of a subsequent Acknowledge Reply.

The subcommand and subcommand data field has the following format:

Decimal	Hex	Value	Description
0-1	0-1	F400	RRL Order Code
2	2	FF	Device Defined Ordering
3-4	3-4	XXXX	Entry Continuation Indicator (See Note 1)
5	5	03 - FF	Entry Length
6	6	01 04 05 FF	Resource Type Requested (See Note 2) Single Byte Fonts Page Segments Overlays All Resources
7	7	00	Resource ID Format Host-Assigned Resource ID
8-9	8-9	XXXX	Resource ID (See Note 2)

Notes:

1. If the entire resource list does not fit in the Special Data Area of the Acknowledge Reply, continuation is necessary which the 4247 Printer will indicate using the Acknowledgement Continuation bit in the flag byte of the Acknowledge Reply. If the host requests Acknowledgement Continuation by sending a command with ARQ bit and the Continuation bit set, the printer will complete the RRL reply using Acknowledgement Continuation. If the host requests RRL continuation (by sending an RRL command with nonzero values in bytes 3 and 4), the printer will use continuation, the printer will default to RRL continuation.
2. For overlays, segments, and symbol sets, this is their two byte ID. This field is omitted when the resource type equals All.

Acknowledge Reply for Request Resource List:

Length	D6FF	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

The format of the resource list returned with the Acknowledge Reply is as follows:

Decimal	Hex	Value	Description
0	0	FF	Unordered List
1	1	01 06	End of List Length of this Entry
2	2	00 01 04 05 FF	Resource Type Resource Size equals 0. The queried Resource Type, ID Format, or ID is unknown, unsupported, or inconsistent. Deletable Single Byte Coded Font Deletable Overlays Resource Size equals 0 The List Query requested is not supported.
3	3	01	Resource ID Format (RIDF) Host-Assigned Resource ID
4	4	00 01	Resource Size Indicator Resource Not Present Resource Present
5-6	5-6	XXXX	Resource ID

Note: Bytes 2 - 6 repeat for each resource type.

Exception Handling Control (EHC)

An exception (error) exists when the printer detects an invalid or unsupported command, control, or parameter value in the data stream received from the host. The IPDS structure provides Alternate Exception Action (AEA) when the printer receives a valid parameter value, but the printer does not support this value. The Exception Handling Control subcommand allows the host control of exception handling by the printer. This subcommand specifies the action the printer is to take with respect to the reporting and processing of exception (error) conditions. The format of the EHC subcommand is:

Decimal	Hex	Value	Description
0-1	0-1	F600	EHC Order Code
2	2		Exception Reporting
Bit 0	Bit 0	0 1	Undefined Character Check Do Not Report Exceptions Report Exceptions

Decimal	Hex	Value	Description
Bit 1	Bit 1	0 1	Page Position Check Do Not Report Exceptions Report Exceptions
Bit 2-6	Bit 2-6		Reserved
Bit 7	Bit 7	0 1	All other Errors Do Not Report Exceptions Report Exceptions
3	3		Alternate Exception Action
Bit 0-6	Bit 0-6		Reserved
Bit 7	Bit 7	0 1	Take Alternate Exception Action and Continue Do Not Take Alternate Exception Action, Proceed per Byte 4
4	4		Exception Presentation Processing
Bit 0-5	Bit 0-5		Reserved
Bit 6	Bit 6	0 1	No Page Continuation Page Continuation (Skip and Continue Action)
Bit 7	Bit 7	0 1	Discard Page Print to point of exception

Exception Reporting: Byte 2 of the EHC subcommand handles exception reporting. Bits 0, 1, and 7 of this byte may be set to report or not report exceptions as defined below. If the exception has no Alternate Exception Action or the printer is told not to take the Alternate Exception Action, the exception is always reported.

- Bit 0: Report Undefined Character Check

When this bit is set to 1, an undefined data character in a Write Text, Write Graphics, or Write Bar Code command causes the printer to report an error to the host program. When this bit is set to 0, the printer does not report Undefined Character Check errors.

- Bit 1: Report Page Position Check

Printing occurs only where the physical medium and the logical page overlap. When bit 1 is set to 1, an attempt to print outside the overlap of the logical page and the physical medium causes the printer to report an error. If bit 1 is set to 0, the printer does not report Position Check errors.

- Bits 2-6: Reserved

- Bit 7: Report all other exceptions

If this bit is set to 1, the printer reports all exceptions other than those defined by bits 0-1. If this bit is set to 0, the printer does not report errors other than those specified above.

If the printer is in home state or the application requests an Acknowledge Reply in an IPDS command, the printer reports exceptions with a Negative Acknowledge Reply (NACK). If an exception occurs within a page, overlay, or page segment, the printer reports the NACK instead of sending a positive acknowledgment of the page, overlay, or page segment.

The first asynchronous NACK is the only one reported, even though other synchronous NACKs may be detected before the first NACK is reported. If the printer has a pending exception (the exception has occurred but has not yet been reported), the printer reports the exception when exception handling control directs.

Alternate Exception Action: Byte 3 of the EHC subcommand controls Alternate Exception Actions.

- Bits 0-6: Reserved
- Bit 7: Alternate Exception Action (AEA) control

This bit defines how printer processing continues when a data stream error occurs.

If the bit is set to 0, the printer continues processing with the Alternate Exception Action. If the error has no Alternate Exception Action defined, the printer continues as though this bit contained a 1.

If this bit is set to 1 or no AEA is defined, the printer reports the error regardless of the value in the Exception Reporting byte above. The printer continues processing as defined by the contents of the Exception Presentation Processing byte below.

Exception Presentation Processing: Byte 4 of the EHC subcommand defines what the printer does when exceptions occur in any state except home state.

- Bits 0-5: Reserved
- Bit 6: Page Continuation

If bit 6 is 0, the printer does the following:

- Terminates processing of the page, overlay, or page segment data
- Prints as much of the previously processed data as possible
- Enters home state.

If bit 6 is set to 1, the printer ignores bit 7 (Error Page Print) after taking a skip and continue action. The printer remains in the current state and treats subsequent commands as No Operation (NOP) until it encounters either the next valid command or a terminating condition.

1. Skip and Continue Action

Skip and Continue Actions are attempts by the printer to skip the remainder of the IPDS block containing the exception and to print subsequent blocks or text on the page (if any).

The printer treats all subsequent commands other than Any State commands (NOP, SHS, STM, and XOA) as No Operation (NOP) commands until it encounters either the next valid command or a terminating condition. The printer remains in page, page segment, or overlay state. If the printer is in a block state, the End command is the next valid command that returns the printer to page, page segment, or overlay state. When the next valid command is encountered, the printer begins normal processing again. The exception that caused the skip and continue action is reported when the end of the page is reached, when an XOA command sets home state, or when a command with an ARQ is received. The following conditions determine the next valid command:

- If the exception occurs in a Write Text command, a Load Font Equivalence command, or an Include Page Segment command, the next valid command is End Page, Set Home State, or XOA Discard Buffered Data.
- If the exception occurs in a block state, the next valid command is End.
- If the exception occurs in an Any-state command, the next valid command is the command that follows.
- If the exception occurs in any other command, the next valid command is one of the following (if supported):
 - Write Text
 - Include Overlay
 - Include Page Segment
 - Write Text Control
 - Write Image Control
 - Write Image Control 2
 - Write Bar Code Control

- Write Graphics Control
- End Page
- Set Home State
- XOA Discard Buffered Data
- Load Font Equivalence.

If the following terminating conditions occur, the printer returns to home state and reports the indicated exception:

- An asynchronous exception occurs such that the printer cannot recover without host intervention. The asynchronous exception is reported and the exception that caused the skip and continue action is discarded.
- A command is received with the ARQ flag set on. The exception that caused the skip and continue action is reported.
- A command is received with a length outside the valid IPDS range. The exception that caused the skip and continue action is reported.
- A command is received that violates the IPDS state diagram. The exception that caused the skip and continue action is reported.

During skip and continue actions, Any-state commands are treated as follows:

- SHS and XOA-DBD are next valid commands in all cases. They are processed, the skip and continue action processing is terminated, the exception is reported, and normal command processing resumes.
- Any-state commands with the ARQ bit set on are terminating conditions. They are not processed; they terminate skip and continue processing, the exception is reported, and the printer returns to home state.
- All other Any-state commands are processed as normal. However, subsequent non-Any-state, non-next valid commands are skipped.

Exceptions detected in included overlays or page segments are treated as though the commands were received as part of the page.

- Bit 7: Error Page Print

If both bits 6 and 7 are set to 1, bit 7 is ignored. If bit 6 is 0 and bit 7 is 1, the printer prints as much of the page as possible and returns to home state.

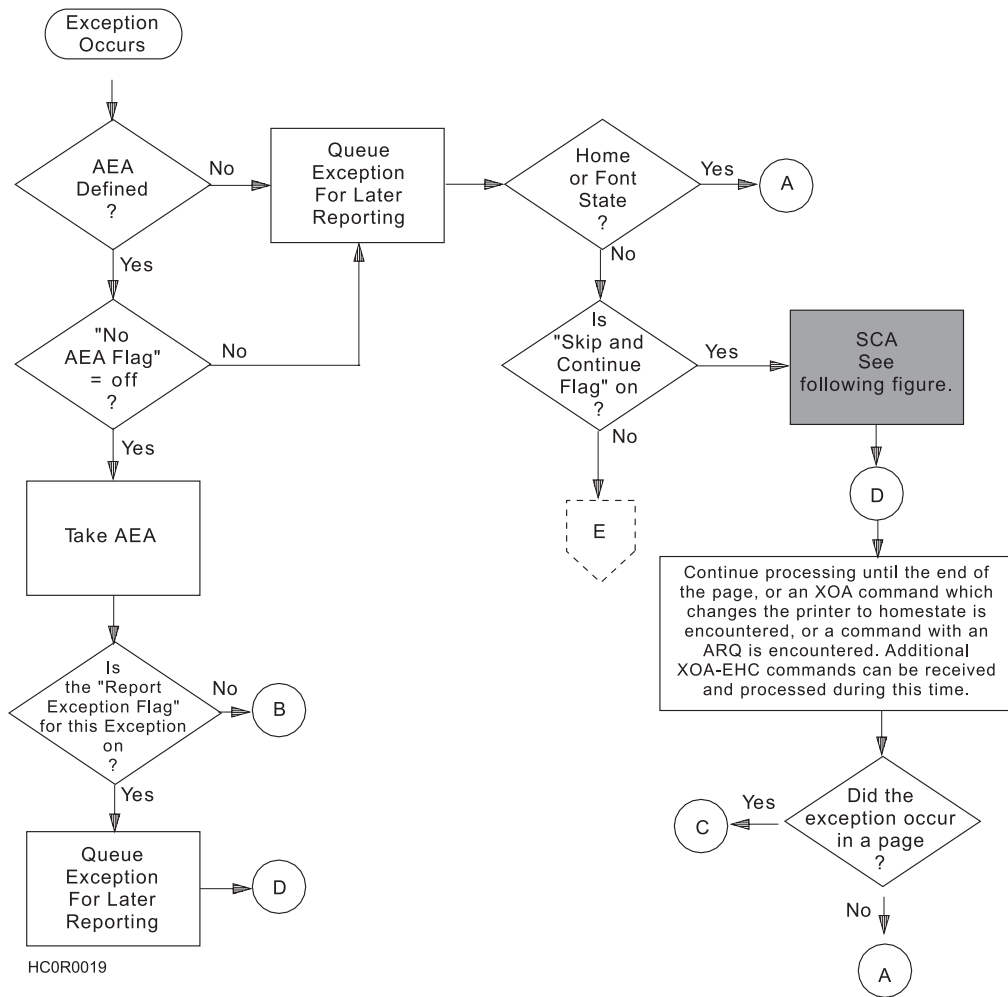


Figure 15. Exception Handling Control (Part 1 of 3)

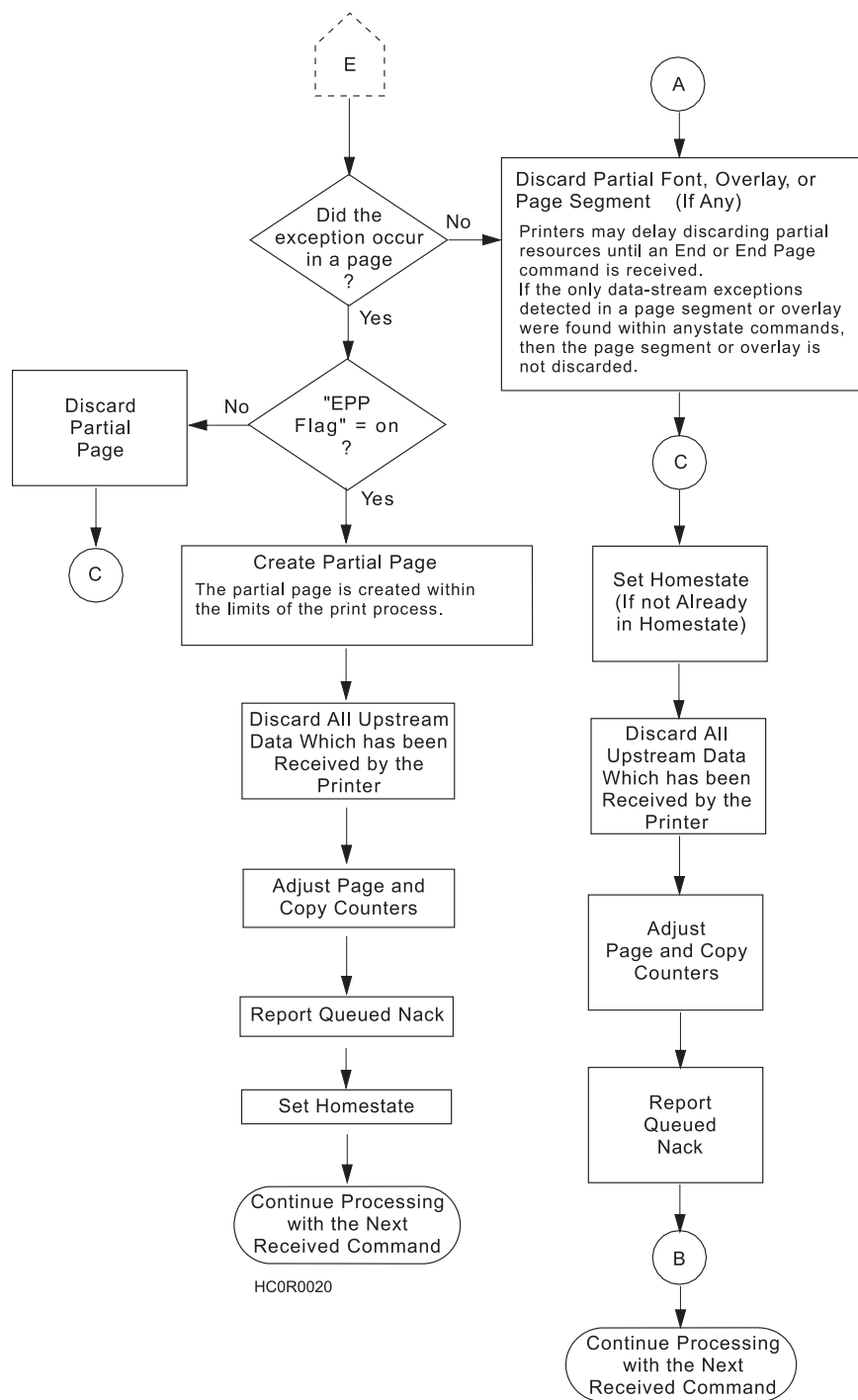


Figure 15. Exception Handling Control (Part 2 of 3)

Skip-and-Continue Actions

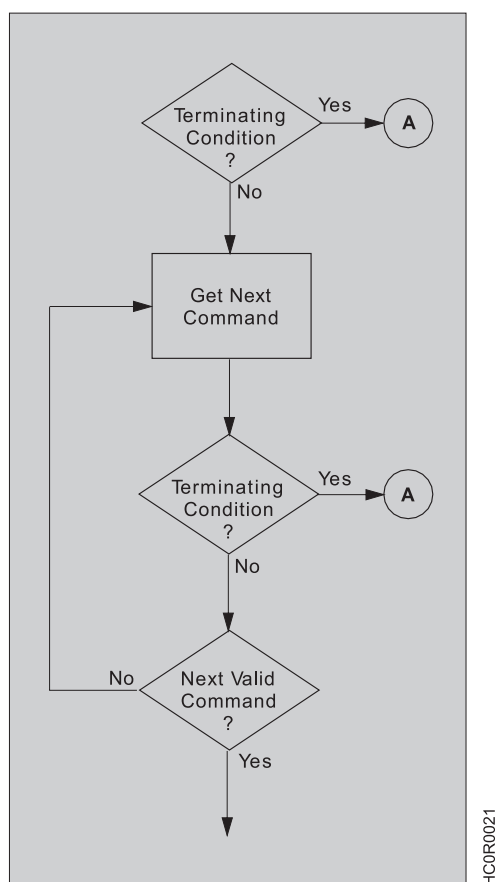


Figure 15. Exception Handling Control (Part 3 of 3)

Print Quality Control (PQC)

The Print Quality Control subcommand allows the host to specify the desired print quality without changing fonts (see notes). The quality selection (from the PQC subcommand) specifies the quality for printing text associated with fonts selected by the Set Coded Font Local (SCFL) command and defined by the Load Font Equivalence (LFE) command. A PQC specifying a print quality compatible with the desired font should precede the SCFL command. The PQC has no effect when the default font (defined by the offline operator panel selection) is in use.

The following bytes contain the print quality selection, as shown:

Byte	Value	Description
Bit 0-1	F800	PQC Order Code
Bit 2	00	Reserved
	01 - 55	DP
	56 - AA	DP Text
	AB - FE	NLQ
	FF	Depends on Operator Panel setting
Note: For model X03 or for model Z03 with Host Fast Draft disabled.		

The following bytes contain the print quality selection, as shown:

Byte	Value	Description
Bit 0-1	F800	PQC Order Code
Bit 2	01 - 2A	Fast Draft Quality
	2B - 55	DP
	56 - AA	DP Text
	AB - FE	NLQ
	FF	Depends on Operator Panel setting
Note: Model Z03 only with Host Fast Draft enabled.		

For printing multiple-density selections of graphics and bar codes, the following values are valid if bar code/graphics density is set to computer selected:

Byte	Value	Description
Bit 0-1	F800	PQC Order Code
Bit 2	01 - 55	Low-Density Graphics/Bar Codes
	56 - FE	High-Density Graphics/High-Contrast Bar Codes
	FF	Depends on Operator Panel setting

Notes:

1. A PQC command can result in a font change in order to provide the desired quality level.
2. The printer changes fonts to satisfy quality selections for all supported code pages except OCR (340), OCR-A (892), or OCR-B (893). It will not change the selected code page to provide a requested quality.

Text Function Set Commands

The text function set contains the commands and data controls for presenting text information on a logical page, page segment, or overlay area on the physical medium. The following commands are the text function set:

Command	Code	Description
LE	D61D	Load Equivalence
WT	D62D	Write Text

The following pages describe the text function set commands.

Load Equivalence (LE)

Length	D61D	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

This command permits Begin and End suppression controls imbedded in data stored within the printer to reference different external values. For example, internal suppression values of 06, 07, and 09 (from a Begin Suppression control) can map to an external value of 02 from a Load Copy Control command, if the printer previously has received an appropriate Load Equivalence command. Thus, the printer can use a single Load Copy Control suppression pair for more than one suppression value (see “Begin Suppression (BSU)” on page 137).

If a Load Copy Control command refers to a suppression identifier that has not been specified as an external value in an LE command, the identifier (external value) will map to itself. This is the only case where the identifier will map to itself unless specified.

This mapping remains in effect until the printer receives another Load Equivalence command, at which time its values will totally replace this mapping.

This command consists of a two-byte parameter followed by a list of 0 to 127 four-byte entries in the following format:

Decimal	Hex	Description
0-1	0-1	Mapping Type - X'0100' Is the Only Valid Value, Indicating Suppression Equivalence Mapping.
2-3	2-3	Internal Value - Value of the Stored Parameter that the Begin Suppression and End Suppression Controls use. Valid Values are from 1 to 255 (X'1' to X'FF').
4-5	4-5	External Value - Value that the Load Copy Control Command uses. This Is the Value for Referencing the Internal Value. Valid Values are from 1 to 127 (X'1' to X'7F').

Notes:

1. Additional entries, each four bytes long, can follow this entry, using the same format as bytes 2 through 5.
2. The mapping of one internal ID to more than one external ID is an error.

Write Text (WT)

Length	D62D	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

One or More Text Controls and Text Characters.

The Write Text command writes text presentation data to the printer. This command is only valid if the printer is in the overlay, page, or page segment state.

The DATA field in this command can contain one or more text controls and text characters. A text control begins with the text control escape sequence introducer, 2BD3. The format for this control is:

2BD3	Length	Control	Parameters
------	--------	---------	------------

The length field of each text control is a one-byte value that gives the number of bytes in the text control. This length value includes the length field itself but excludes the 2BD3 introducer. Multiple text controls without intervening character data can chain together. Bit 7 (the least significant, or rightmost bit) of the control field is the chain bit. If this bit is on, the following text control is chained to the previous control. That is, chaining allows one escape sequence introducer for multiple text controls. With chaining, the first text control contains the X'2BD3' introducer, and each subsequent text control starts with its own length field, followed by its control field and any parameters for that control. The last text control in the chain must have the chain bit off.

A Write Text command can span to another Write Text command. That is, if a Write Text command ends after the control sequence has begun (the 2B has been received), and before all of the control sequence parameters have been received, this Write Text command spans to the next Write Text command. Spanning also occurs if a Write Text command ends between chained controls. Between the spanned Write Text commands, only STM, XOA, and NOP commands are valid. All other commands received at this time result in an error. The printer uses the following controls with the Write Text command:

Control	Description	Control	Description
CO (C1)	Set Inline Margin (SIM)	F4 (F5)	End Suppression (ESU)
C2 (C3)	Set Intercharacter Adjustment (SIA)	E4 (E5)	Draw I-Axis Rule (DIR)
D0 (D1)	Set Baseline Increment (SBI)	E6 (E7)	Draw B-Axis Rule (DBR)
C6 (C7)	Absolute Move Inline (AMI)	EE (EF)	Repeat String (RPS)
D2 (D3)	Absolute Move Baseline (AMB)	DA (DB)	Transparent Data (TRN)
C8 (C9)	Relative Move Inline (RMI)	F8 (F9)	No Operation (NOP)
D4 (D5)	Relative Move Baseline (RMB)	C4 (C5)	Set Variable Space Increment (SVI)
D8 (D9)	Begin Line (BLN)	74 (75)	Set Text Color (STC)
F0 (F1)	Set Coded Font Local (SCFL)	72 (73)	Overstrike (OVS)
F6 (F7)	Set Text Orientation (STO)	76 (77)	Underscore (USC)
F2 (F3)	Begin Suppression (BSU)	78 (79)	Temporary Baseline Move (TBM)
Note: The controls shown in parenthesis are the text controls with their corresponding chain bit on.			

Set Inline Margin (SIM)

2BD3	04	C0 (C1)	P1P2
------	----	---------	------

Description: This control specifies the position of the inline margin in the (I) direction, when the printer performs a Begin Line command. Receipt of this control does not change the current print position.

Parameters P1P2 form a two-byte value that specifies the margin in units. All values between 0 and X'7FFF' are valid. A value of X'FFFF' causes the printer to use the value in the LPD command.

Note: Values as large as X'7FFF' are valid but might be off the page.

Set Intercharacter Adjustment (SIA)

2BD3	04	C2 (C3)	P1P2
------	----	---------	------

or

2BD3	05	C2 (C3)	P1P2P3
------	----	---------	--------

Description: This control specifies additional inline adjustment between graphic characters.

Parameters P1P2 form a two byte value that specifies an additional increment or decrement in the inline direction between text characters in units. All values between 0 and X'7FFF' are valid. A value of X'FFFF' causes the printer to use the value in the LPD command.

Parameter P3 is a direction parameter and is optional. This parameter identifies whether the adjustment is an increment or a decrement. If P3 has a value of 0 or X'FF', the adjustment is an increment. If P3 has a value of 1, the adjustment is a decrement. If this parameter is missing, the default is an increment.

Set Baseline Increment (SBI)

2BD3	04	D0 (D1)	P1P2
------	----	---------	------

Description: This control specifies a distance, which the printer adds to the current baseline coordinate when the printer performs a Begin Line control.

Parameters P1P2 form a two byte value that specifies the baseline increment in units. All values between X'8000' and X'7FFF' are valid. A value of X'FFFF' causes the printer to use the value in the LPD command.

Absolute Move Inline (AMI)

2BD3	04	C6 (C7)	P1P2
------	----	---------	------

Description: This control moves the inline coordinate in the I direction. The move is to an absolute position on the inline (I) axis.

Parameters P1P2 form a two byte value that specifies the new inline coordinate in units. All values between 0 and X'7FFF' are valid.

Notes:

1. Values as large as X'7FFF' are valid but might be off the page.
2. Several Absolute Move Inline controls used in a single line reduce throughput. If possible, replace Absolute Move Inline controls with spaces, or combine multiple Absolute Move Inline controls into a single Absolute Move Inline control.

Absolute Move Baseline (AMB)

2BD3	04	D2 (D3)	P1P2
------	----	---------	------

Description: This control moves the baseline coordinate in the B direction. The move is to an absolute position on the baseline (B) axis.

Parameters P1P2 form a two byte value that specifies the new baseline coordinate in units. All values between 0 and X'7FFF' are valid.

Note: Baseline coordinate values that require a negative baseline displacement in order to print results in an error if the LPD command specifies ordered printing.

Relative Move Inline (RMI)

2BD3	04	C8 (C9)	P1P2
------	----	---------	------

Description: This control moves the inline coordinate relative to the current line coordinate position.

Parameters P1P2 form a two byte value that specifies the displacement value in units. All values between X'8000' and X'FFFF' are valid. Negative values are in twos-complement form.

Notes:

1. Values as large as X'FFFF' are valid but might be off the page.
2. Several Relative Move Inline controls used in a single line reduce throughput. If possible, replace Relative Move Inline controls with spaces, or combine multiple Relative Move Inline controls into a single Relative Move Inline control.

Relative Move Baseline (RMB)

2BD3	04	D4 (D5)	P1P2
------	----	---------	------

Description: This control moves the baseline coordinate relative to the current baseline coordinate position.

Parameters P1P2 form a two byte value that specifies the displacement value in units. All values between X'8000' and X'FFFF' are valid.

Note: Baseline displacement values that require a negative baseline displacement in order to print results in an error if the LPD command specifies ordered printing.

Begin Line (BLN)

2BD3	02	D8 (D9)
------	----	---------

Description: This control moves the inline and baseline coordinates to the first position on the next line. The inline margin sets the inline coordinate. The baseline coordinate increases by the value in the Set Baseline Increment control.

Set Coded Font Local (SCFL)

2BD3	03	F0 (F1)	P1
------	----	---------	----

Description: This control selects a previously assigned font, pitch, and code page. Load Font Equivalence commands assign a local font identifier (LFID) to a specified font, pitch, and character set. The SCFL control then specifies the LFID (in parameter P1) to use for printing. A Print Quality Control subcommand specifying a print quality that is compatible with the LFID (defined by a previous Load Font Equivalence command) must precede the SCFL control to provide the desired font and quality selections. Parameter **P1** is the **LFID** selection. Valid values for this parameter are 01 to X'FF'. A value of X'FF' specifies the LPD value.

Set Text Orientation (STO)

2BD3	06	F6 (F7)	P1-P4
------	----	---------	-------

Description: This control can be set to print right-to-left by selecting 180, 90 (X'5A00', X'2D00') degree orientation. The 4247 Printer forces an inline sequence of 180 degrees for the default font to maintain upright printing when right-to-left printing is selected. The only valid values are 0 and 180 degrees for the inline direction and 90 degrees for the baseline direction. The Logical Page Descriptor command can also be used to select right-to-left printing.

Parameters **P1P2** specify the inline direction and must be a value of X'0000', X'5A00', or X'FFFF'.

Note: If the inline direction is set to 180 degrees, only fonts with 180 degree character rotation can be used or else error 023F02 is flagged.

X'5A00' is an orientation of 180 degrees used to print in a right-to-left direction. X'FFFF' specifies to use the inline direction from the LPD command. Parameters P3P4 specify the baseline direction and must be a value of X'2D00' or X'FFFF'. X'FFFF' specifies to use the baseline direction value from the LPD command. Refer to the description of the LFE command for supported combinations of LFE character rotation and STO.

Begin Suppression (BSU)

2BD3	03	F2 (F3)	P1
------	----	---------	----

Description: This control marks the beginning of a string of text that the printer can suppress from the printed output.

Parameter P1 is a one byte suppression identifier. Valid values are from 1 to X'FF'. An End Suppression control, with the same suppression identifier, must follow the Begin Suppression control. An error results when BSU-ESU text controls are not paired properly or have different suppression IDs.

Suppression of the text output occurs only when activated by a Load Copy Control with a matching suppression ID.

For additional information about suppression, see Suppression ID in the "Load Copy Control (LCC)" on page 110.

End Suppression (ESU)

2BD3	03	F4 (F5)	P1
------	----	---------	----

Description: This control marks the end of a string of text that the printer can suppress from the printed output.

Parameter P1 is a one byte suppression identifier. Valid values are from 1 to X'FF'. A string of suppressed text starts with a Begin Suppression control and ends with an End Suppression control having the same suppression identifier.

Draw I-Axis Rule (DIR)

2BD3	04 or 07	E4 (E5)	P1-P5
------	----------	---------	-------

Description: This control specifies the dimensions of a horizontal rule (line) extending from the current print position. The current position does not change as a result of this control. The rule is not drawn until the current position advances vertically (as a result of other controls).

Parameters P1P2 specify the length of the rule in the inline direction in units. Valid values are from X'8000' to X'7FFF'. Negative values are in twos-complement form.

Parameters P3, P4, and P5 are optional, as a group. That is, either all three parameters are omitted or all three must be included together. Parameters P3P4 specify the width of the rule in the baseline direction in units. Valid values are from X'8000' to X'7FFF'. Also valid is X'FFFF" which selects the printer default of 5 pels wide.

Parameter P5 is ignored by the 4247 Printer.

Draw B-Axis Rule (DBR)

2BD3	04 or 07	E6 (E7)	P1-P5
------	----------	---------	-------

Description: This control specifies the dimensions of a vertical rule (line) extending from the current print position. The current position does not change as a result of this control. The rule is not drawn until the current position advances vertically (as a result of other controls).

Parameters P1P2 specify the length of the rule in the baseline direction in units. Valid values are from X'8000' to X'7FFF'. Parameters P3, P4, and P5 are optional, as a group. That is, either all three parameters are omitted or all three must be included together.

Parameters P3P4 specify the width of the rule in the inline direction in units. Valid values are from X'8000' to X'7FFF'. Negative values are in twos-complement form. Also valid is X'FFFF'. This selects the printer default of 5 pels wide.

Parameter P5 is ignored by the 4247 Printer.

Repeat String (RPS)

2BD3	04-FF	EE (EF)	P1-P n
------	-------	---------	----------

Description: This control contains a string of coded graphic characters that repeats on the current line.

Parameters P1P2 specify the repeat length. This is the total length of the generated string.

Parameters P3 through P n are the repeat data. The data specified in bytes P3 through P n repeats until the output equals the repeat length specified in parameters P1P2. The data field can be a maximum of 253 bytes. The printer does not check the data for the control sequence introducer (X'2B'). If the repeat length is zero, this control is a no-op. If the count equals 04, but the repeat length is greater than zero, an error occurs.

Transparent Data (TRN)

2BD3	02-FF	DA (DB)	P1-P n
------	-------	---------	----------

Description: This control marks the beginning of a string of coded characters, which the printer does not check for an embedded X'2B' escape sequence. The inline position increments for each position in the string.

Parameters P1 through P n are the graphic characters. The data field can be a maximum of 253 bytes.

No Operation (NOP)

2BD3	02-FF	F8 (F9)	P1-P n
------	-------	---------	----------

Description: This control specifies a string of bytes that the printer ignores. The printer ignores all parameter data. The data field can be a maximum of 253 bytes.

Set Variable Space Increment (SVI)

2BD3	04	C4 (C5)	P1P2
------	----	---------	------

Description: The Variable Space Increment is a two byte positive value that defines the width of the variable space character in units. Parameters **P1P2** are the **width** value. Valid values are 0 to X'7FFF'. X'FFFF' equals the printer default. The variable space character is X'40' for EBCDIC code pages and X'20' for ASCII code pages.

Set Text Color (STC)

2BD3	04 or 05	74 (75)	P1-P3
------	----------	---------	-------

Description: This control specifies the color attributes for text.

Parameters P1P2 are the color attributes, as shown:

Hex	Color	Hex	Color
0000	Black (Default)	0008	Black
FF00	Black	FFFF	Use Current Default
FF07	Black (Default)		

Note: For Limited Simulated Color Support, all valid but unsupported color values for text data are accepted and result in simulation of the specified colors without generation of unsupported color exceptions. In the 4247 Printer, simulation of Color of Medium is done by printing in Color of Medium except where not possible because of different resolutions when text overlays graphics, image, or barcode. For actual colors, all valid colors not listed in the above table are simulated in the 4247 Printer by printing in black.

Parameter P3 is the precision parameter. This parameter is optional and has the following meaning:

- 00** If the color is not supported or cannot be printed as requested, the printer reports an exception. Printing is in the default color if alternate exception action is invoked.
- 01** If the color is not supported or cannot be printed as requested, the printer does not report an exception, regardless of the EHC, and printing is in the default color.
- FF** If the color is not supported or cannot be printed as requested, the printer reports an exception. Printing is in the default color if alternate exception action is invoked.

Overstrike (OVS)

2BD3	05	72 (73)	P1-P3
------	----	---------	-------

Description: This control identifies text that the printer overstrikes with a specified character. The overstrike character prints using the font and character set that is active when the printer receives the Overstrike command.

Parameter P1 is the bypass identifier. This parameter controls white space to be overstruck, depending on its value, as shown:

Bits 0-3

Reserved

Bit 4

- 0 Overstrike white space from Relative Move Inline
- 1 Bypass white space from Relative Move Inline

Bit 5

- 0 Overstrike white space from Absolute Move Inline
- 1 Bypass white space from Absolute Move Inline

Bit 6

- 0 Overstrike white space from Space or Variable Space Character
- 1 Bypass white space from Space or Variable Space Character

Bit 7

- 0 Bypass Treat Bits 0-6 according to their set values
- 1 No Bypass Treat Bits 0-6 as if their values were set to 0.

Note: If bit 7 is on, the printer treats all other bits in byte P1 as zeros, regardless of their values.

The printer ignores parameter **P2** for this control. Parameter **P3** is the **overstrike** character.

An OVS command with a bypass value of 00 ends overstrike mode.

Underscore (USC)

2BD3	05	76 (77)	P1-P3
------	----	---------	-------

Description: This control identifies text the printer underscores at the baseline of the current line. The underscore prints using the same print quality as the text.

Parameter P1 is the bypass identifier. This parameter controls underscoring of white space, depending on its value, as shown:

Bits 0-3

Reserved

Bit 4

0 Underscore white space from Relative Move Inline
1 Bypass white space from Relative Move Inline

Bit 5

0 Underscore white space from Absolute Move Inline
1 Bypass white space from Absolute Move Inline

Bit 6

0 Underscore white space from Space or Variable Space Character
1 Bypass white space from Space or Variable Space Character

Bit 7

0 Bypass Treat Bits 0-6 according to their set values
1 No Bypass Treat Bits 0-6 as if their values were set to 0.

X'FF'

No bypass in effect.

Note: If bit 7 is on, the printer treats all other bits in byte P1 as zeros, regardless of their values.

A USC command with a bypass value of 00 ends underscore mode.

Temporary Baseline Move (TBM)

2BD3	03 or 06	78 (79)	P1-P4
------	----------	---------	-------

Description: This control changes the position of the sequential baseline without change to the established baseline. This control also stops and starts both subscript and superscript printing.

Parameter P1 is the direction parameter. Its values are:

- 00** Do not change baseline
- 01** Return to established baseline
- 02** Shift baseline away from the I axis (subscript) one additional temporary baseline increment, per parameters P3 and P4
- 03** Shift baseline towards the I axis (superscript) one additional temporary baseline increment, per parameters P3 and P4.

Parameter P2 is the precision parameter. Its values are:

- 00** Baseline shift is not simulated and the active font is used.

- 01** A substitute font with characteristics identical to the current font may be used to simulate baseline shift (superscript/subscript).
- FF** Same as 00.

Note: When subscript or superscript is active, double high printing will not occur.

Parameters P3 and P4 are the temporary baseline increments. Its values are:

- 0000 - 7FFF** Temporary Baseline Increment
- FFFF** Half the current baseline increment.

Image Function Set Commands

The image function set contains the commands and data controls for presenting image data on a logical page, page segment, or overlay area on the physical medium. The following commands are the image function set:

Command	Code	Description
WIC	D63D	Write Image Content
WI	D64D	Write Image
END	D65D	End

Write Image Control (WIC)

Length	D63D	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

The Write Image Control command causes the printer to enter the image block state. The command sequence that follows directs an image presentation block area on the current page, overlay, or page segment that is being constructed.

The parameters of this command define the input and output size of the image array and the necessary information for interpreting the input data.

In the page state, the printer checks all the Write Image Control command parameter values for validity. If the parameters are not within the valid ranges, an exception condition exists.

An image cannot print outside the page without an error. If any part of the image extends beyond the physical or logical page, no image prints and an exception occurs.

The DATA field bytes have the following meaning for this command:

Decimal	Hex	Value	Description
0-1	0-1	1 - 7FFF	Output - Pels per Scan Line
2-3	2-3	1 - 7FFF	Output - Number of Scan Lines
4-5	4-5	1 - 7FFF	Input - Pels per Scan Line
6-7	6-7	1 - 7FFF	Input - Number of Scan Lines
8	8	00	No Compression Algorithm
9	9	00	Pel Data Format - One Bit per Pel
10-11	A-B	0101 0202	No Magnification Scale by 2, Both X and Y

Decimal	Hex	Value	Description
12-13	C-D	0000	Zero Degrees Scan Line Direction
14-15	E-F	2D00	90 Degrees Scan Line Sequence Direction
16	10	00 20 40 60 AD	Coordinate Type (See note 1) Absolute I, Absolute B Absolute I, Relative B Relative I, Absolute B Relative I, Relative B Absolute X, Absolute Y
17-19	11-13	FF8000 - 7FFF	First Pel X or I Coordinate
20	14	00	Reserved
21-23	15-17	FF8000 - 7FFF	First Pel Y or B Coordinate
24-25	18-19	0000, 0008, FF00, FF07, FF08	Color - Same as Text and Graphics Color Values (See note 2)

Notes:

1. Only A0 can be used if the text is set to 180/90 degrees.
2. The 4247 Printer provides Limited Simulated Color Support. All architecturally defined color values for image data are accepted and result in simulation of the specified colors without generation of unsupported color exceptions. All valid colors not listed in the above table (X'0001' through X'0007', X'0009' through X'0010', and X'FF01' through X'FF06') are simulated by printing in black.

Coordinate Type: Can be either an absolute or a relative value. Absolute values specify a location on the logical page relative to the reference coordinates. Relative values specify a location on the logical page relative to the current coordinates.

If byte 10 equals X'00', the 4247 Printer uses the absolute values of I and B, as specified in bytes 11 through 13 and bytes 15 through 17 of this command. These values are the text inline and text baseline coordinates, respectively.

If byte 10 equals X'20', the 4247 Printer uses the absolute value of I and the relative value of B. The absolute I value is the text inline coordinate (bytes 11 through 13 of this command); the relative B value is the sum of the current text baseline coordinate and the value specified in bytes 15 through 17 of this command.

If byte 10 equals X'40', the 4247 Printer uses the relative value of I and the absolute value of B. The relative I value is the sum of the current text inline coordinate and bytes 11 through 13 of this command; the absolute B value is the text baseline coordinate, specified in bytes 15 through 17 of this command.

If byte 10 equals X'60', the 4247 Printer uses the relative value of I and the relative value of B. The relative I value is the sum of the current text inline coordinate and bytes 11 through 13 of this command; the relative B value is the sum of the current text baseline coordinate and bytes 15 through 17 of this command.

If byte 10 equals X'A0', the current logical page X and Y coordinates determine the origin. When the block is within a page, WIC bytes 11 through 13 and 15 through 17 specify the offset from the X-coordinate and Y-coordinate origin specified in a previously received LPP command (or from the printer default coordinates if no LPP command is received). When the block is within an overlay that is invoked using an LCC command, WIC bytes 11 through 13 and 15 through 17 specify the offset from the X_m-coordinate and

Y_m -coordinate origin. When the block is within an overlay that is invoked using an IO command, WIC bytes 11 through 13 and 15 through 17 specify the offset from the X-coordinate and Y-coordinate origin specified in the IO command.

Bytes C through D must equal 0 degrees scan line direction and bytes E through F must equal 90 degrees scan line sequence direction. The Coordinate Type byte 10 is not used to modify the image direction.

Write Image (WI)

Length	D63D	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

This command transmits a block of image data to the printer. A sequence of one or more Write Image commands follows the Write Image Control command and terminates with an End command.

The total number of bits of image is equal to the product of the number of source scan lines and the number of bits on each scan line. Thus, the number of bytes sent is:

(Bytes 4 through 5 x bytes 6 through 7 of the WIC command) divided by 8

Note: If this calculation yields a fractional remainder, round the result to the next whole number. The DATA parameter bytes contain the image bit string.

End (END)

For a description of the End control, see “End (END)” on page 114.

Graphics Function Set Commands

The graphics function set contains the commands and data controls for presenting graphic pictures on a logical page, page segment, or overlay area on the physical medium. The following commands are the graphics function set:

Command	Code	Description
WGC	D684	Write Graphics Content
WG	D685	Write Graphics
END	D65D	End

Graphics is a data type the printer uses to present line art picture drawings in a graphics block area on a page. A sequence of drawing orders produce arcs, lines, fillets, character strings, markers, and other elements that define the drawing. These orders, grouped into one or more segments, present the picture.

The control unit sends a Write Graphics Control command to the printer to establish the control parameters and initial drawing conditions for presenting the picture data. The picture segments themselves are sent to the printer as data in one or more Write Graphics commands.

Knowing how the graphics picture is developed allows an understanding of the relationship between the Write Graphics command and the Write Graphics Control command. The following pages explain the drawing order coordinates, the graphic medium presentation space, and the graphic block area.

Drawing Order Coordinate System

The drawing orders specify graphics in an abstract space rather than directly on the page. This allows repositioning graphics on a page without changing the drawing orders. Coordinates (Graphics X and Y) specify the position of the graphic.

Note: The Graphics X and Y coordinates are not the same as the media X and Y coordinates. The horizontal axis is Graphics X; the vertical axis is Graphics Y. The intersection of the Graphics X and Y axes is coordinate (0,0). The horizontal axis is positive to the right of center and negative to the left of center. The vertical axis is positive to the top of center and negative to the bottom of center. Therefore, both positive and negative values are valid. Negative values are specified in two's-complement form.

All coordinates are in coordinate units, called **drawing units** that are the same as units in the Graphics Data Descriptor (GDD) structured fields. Figure 6-27 shows the Graphics X and Y coordinate system.

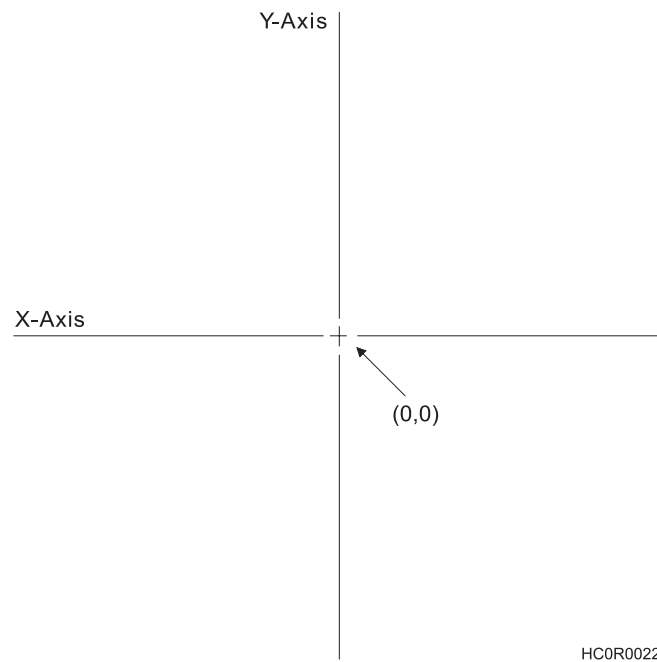


Figure 16. The Graphics X and Y Coordinate System

Graphic Medium Presentation Space

The graphic medium presentation space is an abstract coordinate space where graphics are composed. It is a conceptual structure defined by the limits of the coordinate space as shown in Figure 17 on page 146. Units are defined in “Graphic Data Descriptor (GDD)” on page 151.

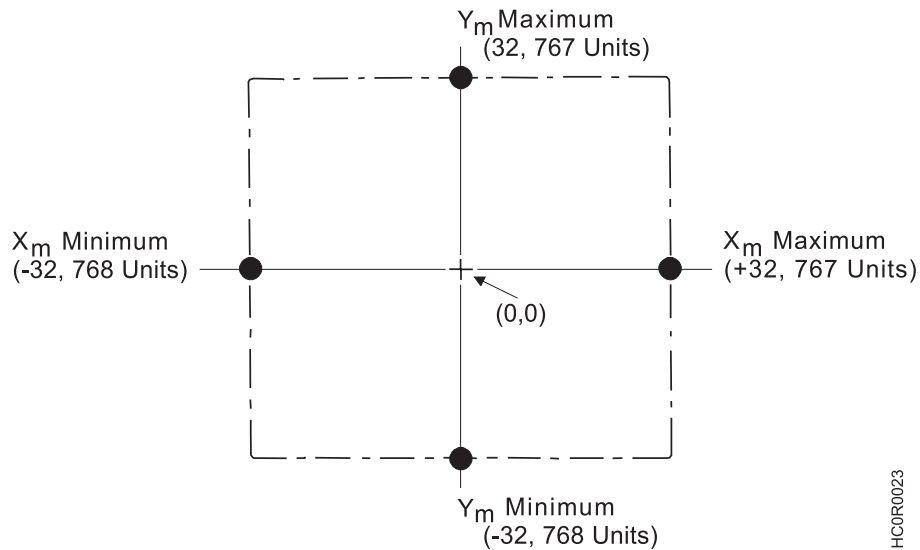


Figure 17. The Graphic Medium Presentation Space and Its Limits

Graphic Window

The graphic window is a user-defined, rectangular area within the graphic medium presentation space. This area is the source from where information is selected for printing. Figure 18 illustrates the relationship of the graphic window to the graphic medium presentation space.

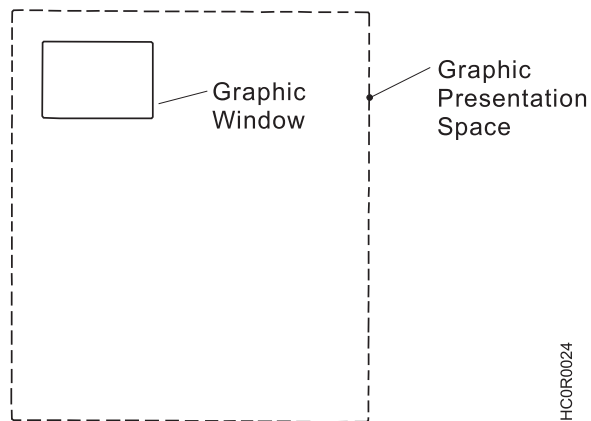


Figure 18. The Graphic Window within the Graphic Medium Presentation Space

Graphic Block Area

The graphic block area is the part of the current physical medium in which the graphics is printed.

The graphic block area can overlap other output (such as text or images) specified earlier for the same page. Likewise, subsequent output specified by other commands for the same page can overlap the graphic block area. Figure 19 on page 147 shows the graphic block area and its relationship to the physical medium.

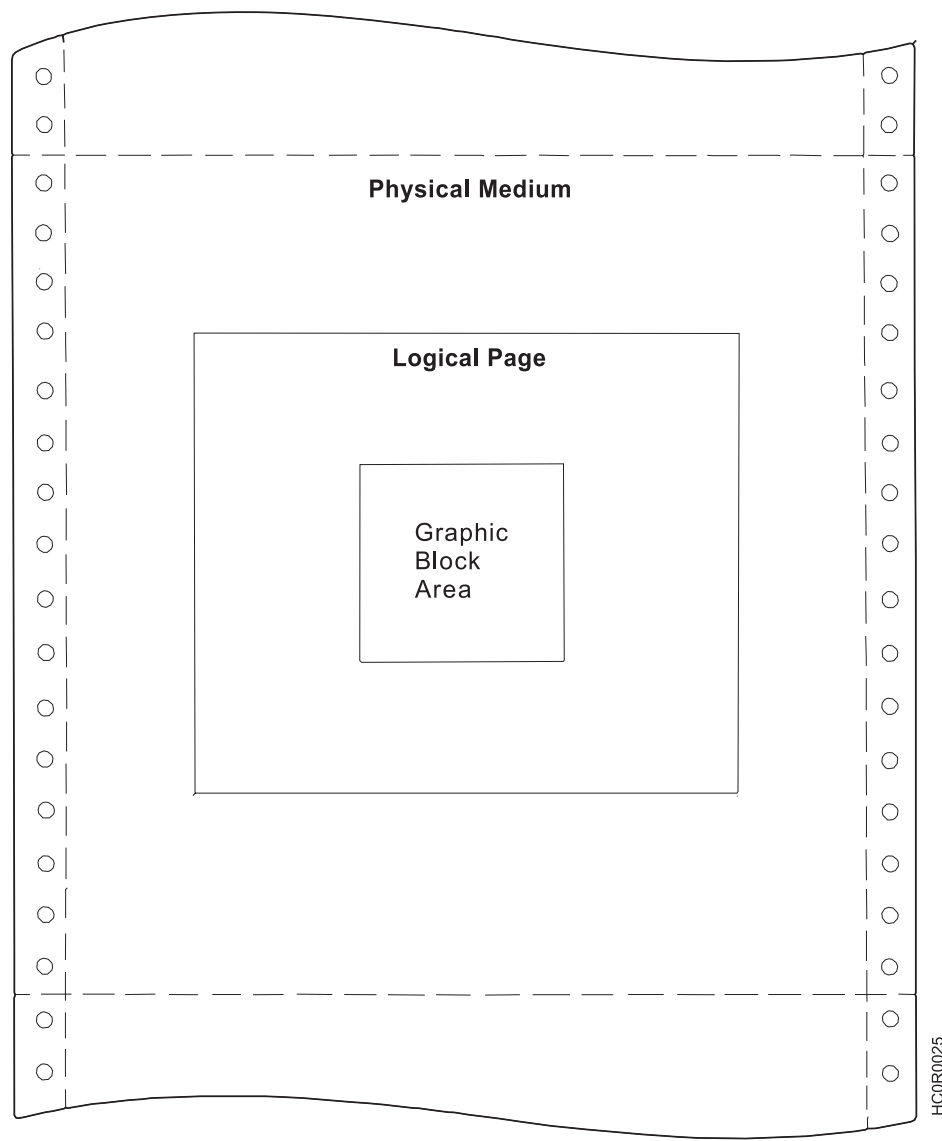


Figure 19. The Graphic Block Area on the Physical Medium

Positioning the Graphic Window in the Graphic Block Area

As mentioned previously, the graphic window can be any size within the graphic presentation space limits. The graphic block area size can be the entire physical Medium or a portion of the physical medium.

The Write Graphics Control command, described in detail in “Write Graphics Control (WGC)” on page 148, specifies the mapping of the graphic window to the graphic block area.

The term **mapping** refers to the transformation of an abstract space into its size and position on the physical medium. There are three ways to map the abstract space. They are scale-to-fit, center-and-trim, and position-and-trim mapping. These mapping methods are described in detail in “Area Mapping Control Options” on page 153.

Write Graphics Control (WGC)

Length	D684	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

GAP	GOC	GDD
-----	-----	-----

The Write Graphics Control command causes the printer to enter the graphics block state. The parameters of this command define the size, placement, and orientation of the graphic block area and establish the initial conditions for interpreting the graphic data. Receiving the End command in the graphic block state terminates the processing of the graphic data.

The Write Graphics Control data consists of three consecutive structured fields:

- The Graphic Area Position control defines the position of the graphics picture on the page.
- The Graphic Output Control (GOC) defines the size of this picture on the page.
- The Graphic Data Descriptor (GDD) defines the size of the graphics window and the default characteristics of the graphics picture.

Each structured field contains a two byte length field, then a two byte structured field ID, and finally a data field.

Note: The quality of the graphics output is affected by the graphics mode and direction parameter values selected at the operator panel (see the *User's Guide* for your model printer), and by the Print Quality Control command (see "Print Quality Control (PQC)" on page 132).

Graphic Area Position Control (GAP)

GAP	GOC	GDD
-----	-----	-----

Length	ID	DATA
--------	----	------

The Graphic Area Position Control structured field is the first structured field in the DATA portion of the Write Graphics Control command. This field defines the position and orientation of the graphic block area. The top left corner of the graphic block area is defined relative to the reference coordinate system.

The format of the GAP field is:

Decimal	Hex	Value	Description
0-1	0-1	000B - (n + 1)	Length of this Field
2-3	2-3	AC6B	Structured Field ID
4-5	4-5	8000 - 7FFF	X Coordinate Position or Inline Coordinate Position of the Graphic Block Area in Units (Position of the Top Left Corner)
6-7	6-7	8000 - 7FFF	Y Coordinate Position or Baseline Coordinate Position of the Graphic Block Area in Units (Position of the Top Left Corner)
8-9	8-9	0000 5A00	When you use the X,Y coordinate system or the I,B coordinate system with the inline orientation system equal to 0 degrees, you must use the 0 degree orientation for graphics. When you use the I,B reference system and the inline orientation is 180 degrees, you must use the 180 degree orientation for graphics.

Decimal	Hex	Value	Description
10	A	00 20 40 60 A0	Reference Coordinate System: Absolute I, Absolute B Absolute I, Relative B Relative I, Absolute B Relative I, Relative B Absolute X, Absolute Y
11- <i>n</i>	B- <i>n</i>		Reserved

Figure 20 shows the Graphic Block Area Position control specifying the top left reference point for the graphic block area.

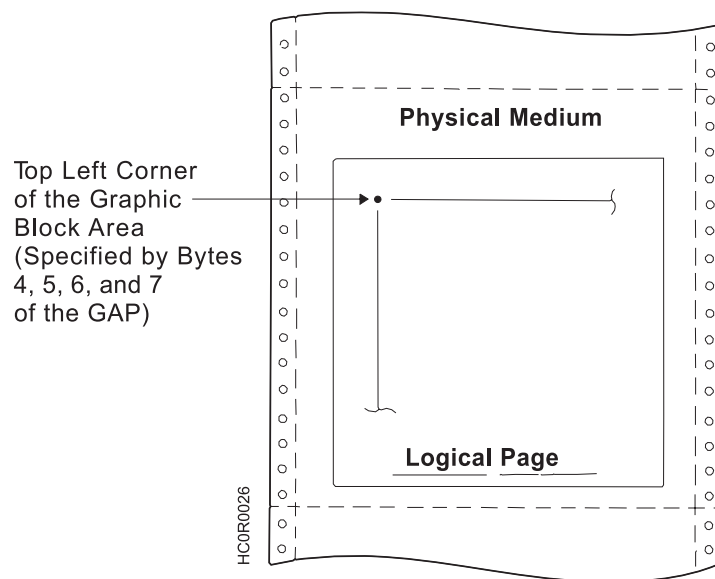


Figure 20. Graphic Block Area Position Control and the Graphic Block Area

Byte A of the GAP specifies the reference coordinate system. The reference coordinate system used for determining the top left corner of the graphic block area can be either the media X,Y or the I,B coordinate system.

If byte A equals X'00', the absolute I and B coordinates determine the top left corner. GAP bytes 4 and 5 specify the text inline coordinate. GAP bytes 6 and 7 specify the text baseline coordinate.

If byte A equals X'20', the absolute I and relative B coordinates determine the top left corner. GAP bytes 4 and 5 specify the text inline coordinate. GAP bytes 6 and 7 add to the last text baseline coordinate position used prior to graphics.

If byte A equals X'40', the relative I and absolute B coordinates determine the top left corner. GAP bytes 4 and 5 add to the last text inline coordinate position used prior to graphics. GAP bytes 6 and 7 specify the text baseline coordinate.

If byte A equals X'60', the relative I and B coordinates determine the top left corner. GAP bytes 4 and 5 add to the last text inline coordinate position used prior to graphics. GAP bytes 6 and 7 add to the last text baseline coordinate position used prior to graphics.

If byte 10A equals X'A0', the current logical page X and Y coordinates determine the origin. When the block is within a page, GAP bytes 4 through 7 specify the offset from the X-coordinate and Y-coordinate origin specified in a previously received LPP command (or from the printer default coordinates if no LPP command was received). When the block is within an overlay that is invoked using an LCC command, GAP bytes 4 through 7 specify the offset from the X_m -coordinate and Y_m -coordinate origin. When the block is within an overlay that is invoked using an IO command, GAP bytes 4 through 7 specify the offset from the X-coordinate and Y-coordinate origin specified in the IO command.

When you use the X,Y coordinate system or the I,B coordinate system with the inline orientation equal to 0 degrees, you must use the 0 degree orientation for graphics.

When you use the I,B reference system and the inline orientation is 180 degrees, you must use the 180 degree orientation for graphics.

Graphic Output Control (GOC)

GAP	GOC	GDD
-----	-----	-----

Length	ID	DATA
--------	----	------

The Graphic Output Control structured field is the second structured field in the DATA portion of the Write Graphics Control command. This field specifies the size of the graphic block area and a mapping option for placing the graphic window into the graphic block area. This field is optional and does not need to be in the Write Graphics Control command. If the GOC field is not present, the printer uses:

- The mapping option X'30' (where offset equals zero)
- X offset and Y offset equals zero
- Graphics block size equals the graphics medium presentation space window size defined in the GDD self-defining field.

The format of the GOC field is:

Decimal	Hex	Value	Description
0-1	0-1	0010 - ($n + 1$)	Length of this Structured Field
2-3	2-3	A66B	Structured Field ID
4	4	00 01	Unit Base (10 in.) Unit Base (10 cm)
5-6	5-6	05A0 - 7FFF 1626 - 7FFF	Units per Unit Base (10 in.) (See Note 1) Units per Unit Base (10 cm) (See Note 1)
7-8	7-8	1 - 7FFF FFFF	Width of Graphic Block Area in Units Use Value From LPD Command
9-10	9-A	1 - 7FFF FFFF	Height of Graphic Block Area in Units Use Value From LPD Command
11	B	10 20 30	Area Mapping Control Option (See Note 2) Scale-to-Fit Center-and-Trim Position-and-Trim
12-13	C-D	8000 - 7FFF	X Offset in Units (See Note 3)
14-15	E-F	8000 - 7FFF	Y Offset in Units (See Note 3)

Decimal	Hex	Value	Description
16-17	10- <i>n</i>		Reserved

Notes:

1. For bytes 5 through 6 (units per base value), 14400/10 in. is supported precisely. Multiples of 14400/10 in. are also supported. If byte 4 specifies units in centimeters and byte B specifies 20 (center-and-trim) or 30 (position-and-trim), then bytes 5 through 6 must be equivalent to a supported value such as X'1626' or X'2C4C'.
2. See "Area Mapping Control Options" on page 153.
3. The printer ignores the X and Y offset fields unless byte B equals X'30'. These values are the offset of the top left corner of the graphic window relative to the top left corner of the graphic block area.

Figure 21 shows the Graphic Output Control parameters specifying the size of the graphic block area.

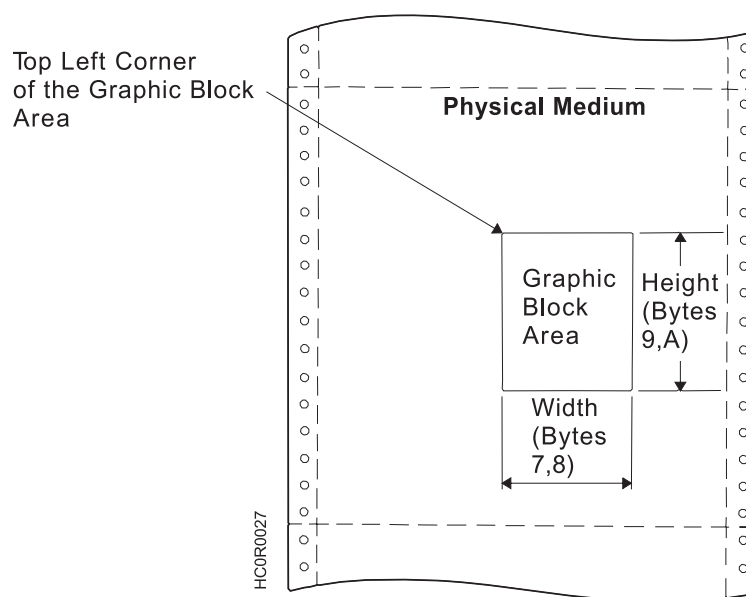


Figure 21. Graphic Output Control and the Graphic Block Area

Graphic Data Descriptor (GDD)

GAP	GOC	GDD
-----	-----	-----

Length	ID	DATA
--------	----	------

The Graphic Data Descriptor is the last structured field in the DATA portion of the Write Graphics Control command. This field specifies the parameters for the graphic window in the graphic medium presentation space (GPS) and sets the drawing default conditions. The graphic window limits define the range of drawing order coordinate values that map to the graphic block area.

Without causing an error, the drawing orders can specify GPS coordinates in the X'8000' to X'7FFF' range. The specified GDD graphic window limits select the part of the drawing order's picture to consider for mapping to the output area.

The format of the GDD field is:

Decimal	Hex	Value	Description
0-1	0-1	001C - ($n + 1$)	Length of this Structured Field
2-3	2-3	A6BB	Structured Field ID
4	4	00	Unit Base (10 in.)
		01	Unit Base (10 cm)
5	5	00	Reserved
6-7	6-7	05A0 - 7FFF	Units per Unit Base (10 in.) (See Note)
		1626 - 7FFF	Units per Unit Base (10 cm) (See Note)
8-9	8-9	05A0 - 7FFF	Units per Unit Base (10 in.) (See Note)
		1626 - 7FFF	Units per Unit Base (10 cm) (See Note)
10-13	A-D	00000000	Reserved
14-15	E-F	8000 - 7FFF	X Left Limit of the Graphic Window in GPS coordinate units
16-17	10-11	8000 - 7FFF	X Right Limit of the Graphic Window in GPS coordinate units
18-19	12-13	8000 - 7FFF	Y Top Limit of the Graphic Window in GPS coordinate units
20-21	14-15	8000 - 7FFF	Y Bottom Limit of the Graphic Window in GPS coordinate units
22-25	16-19	00000000	Reserved
26-27	1A-1B	0000	Graphics Flags - Ignored
28- n	1C- n		Initial Graphic Default Conditions - Self-Describing Instructions that Set the Drawing Defaults for the Picture (See Note) (Optional field)
Note: See “Self-Describing Instructions” on page 156. Figure 22 on page 153 shows the Graphic Data Descriptor control parameters specifying the size of the graphic window.			

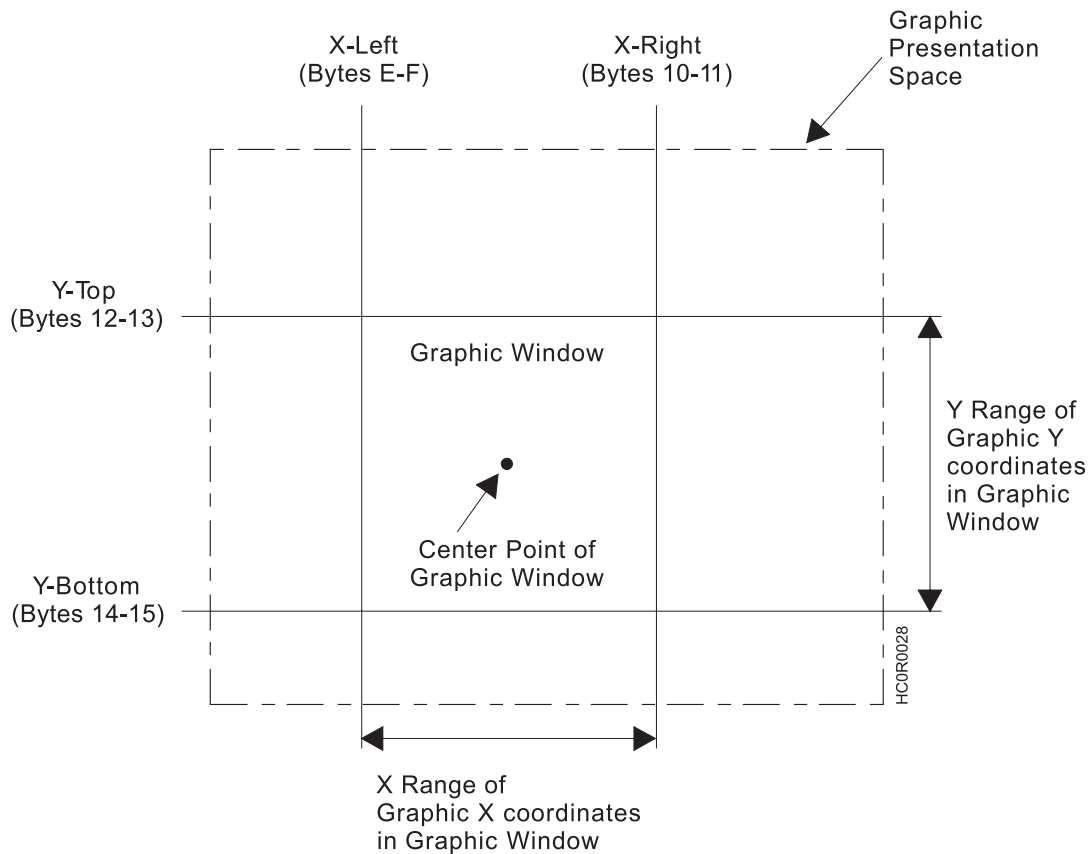


Figure 22. Graphic Data Descriptor and the Graphic Medium Presentation Space

Area Mapping Control Options

Byte B in the GOC data field is the area mapping control option byte. The option values are:

- 10 - Scale to fit
- 20 - Center and trim
- 30 - Position and trim.

Scale to Fit Mapping: The center of the graphic window is mapped to the center of the graphic block area and the graphic data is scaled by the printer (to a printer-supported unit per unit base) so that the picture within the graphic window fits entirely within the output area at the closest maximum scale.

Figure 23 on page 154 shows the result of scale-to-fit mapping. For this example, the graphic window is shown larger than the graphic block area. The parameters in the Graphic Data Descriptor specify the size of the graphic window (in GPS coordinate units). The parameters in the Graphic Area Position and the Graphic Output Control specify the size and location of the graphic block area on the physical medium.

If the graphic block area is smaller than the graphic window, as shown in this example, the graphic window is proportionally reduced to fit in the graphic block area. That is, the entire graphic drawing contained within the graphic window appears in the graphic block area, reduced in size to fit in the graphic block area.

This size reduction is done to scale, keeping the same proportions as the original graphic drawing.

Notes:

1. The printer will not rescale graphics image data. If the image data does not fit within the output area, clipping of the image data occurs.
2. Graphics markers are not scaled; they are always 3 mm (0.12 in. [17/144-in.]) square. If markers are drawn close to the boundary of a page and the page is then scaled down, the center points of the markers are scaled closer to the boundary of the page but the marker size is still the same. The markers may be clipped from the page if the scaling factor scales the centers of the markers too close to the edge.

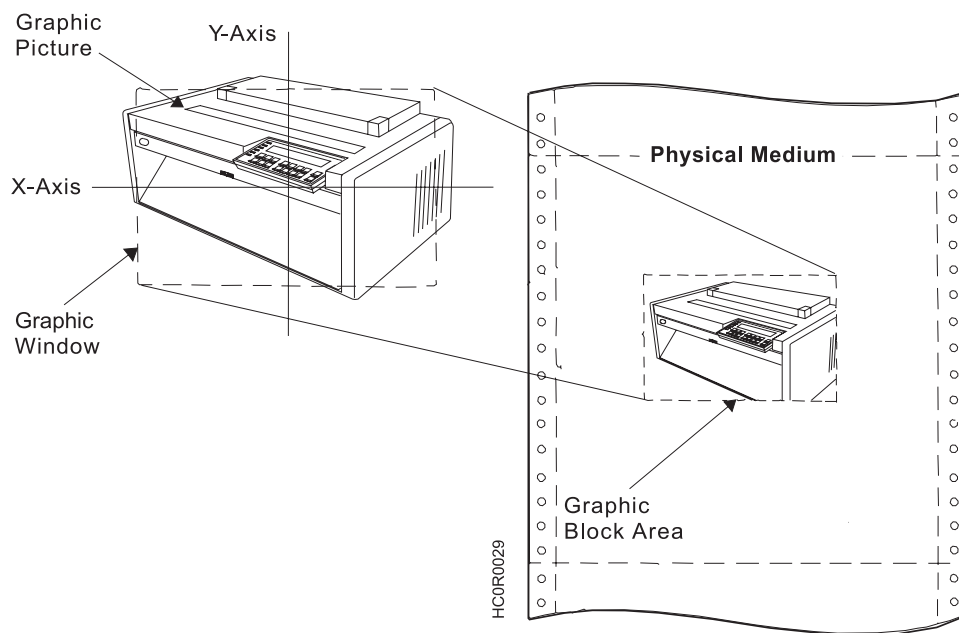


Figure 23. Scale-to-Fit Mapping

Center and Trim Mapping: The center of the graphic window is mapped to the center of the graphic block area and the graphic data is presented at the specified scale. Any portion of the picture that goes outside the graphic block area is clipped to the graphic block area boundary. Figure 24 on page 155 shows the result of center-and-trim mapping. For this example, the graphic window is shown smaller than a previously defined graphic picture. This picture is to be placed on the physical medium. The parameters in the Graphic Data Descriptor specify the size of the graphic window (in graphic medium presentation space (GPS) units). The parameters in the Graphic Area Position and the Graphic Output Control specify the size and location of the graphic block area on the physical medium.

If the graphic block area is smaller than the graphic window, as shown in this example, a portion of the graphic picture is eliminated. The centers of the graphic window and the graphic block area coincide, and the boundaries of the graphic block area determine the limits of the graphic picture. Any portion of the graphic picture extending beyond the graphic block area will not be drawn on the page.

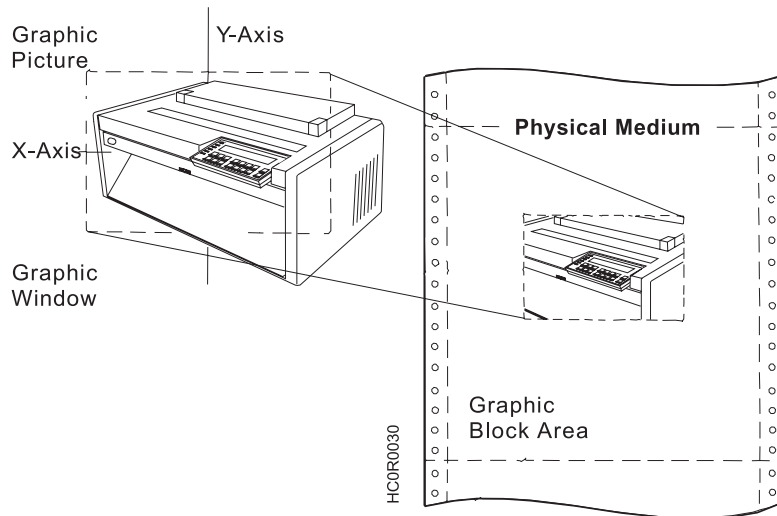


Figure 24. Center-and-Trim Mapping

Position and Trim Mapping: The upper left-hand corner of the graphic window is mapped to the graphic block area using the specified offset and presented at the specified scale. Any portion of the picture that goes outside the graphic block area is clipped to the area boundary. Figure 25 on page 156 shows the result of position-and-trim mapping. For this example, the graphic window is shown smaller than a previously defined graphic picture. This picture is to be placed on the physical medium. The parameters in the Graphic Data Descriptor specify the size of the graphic window. The parameters in the Graphic Area Position and the Graphic Output Control specify the size and location of the graphic block area on the physical medium.

If the graphic block area is smaller than the graphic window, a portion of the graphic picture is eliminated. The top-left corner of the graphic window is either coincident with the top left corner of the graphic block area, or it is offset from the top left corner of the graphic block area by a distance specified in the Graphic Output Control. Only the portion of the picture contained within the overlapping areas of the graphic window and the graphic block area will be drawn. The printer trims (eliminates) the portion of the graphic picture outside this area.

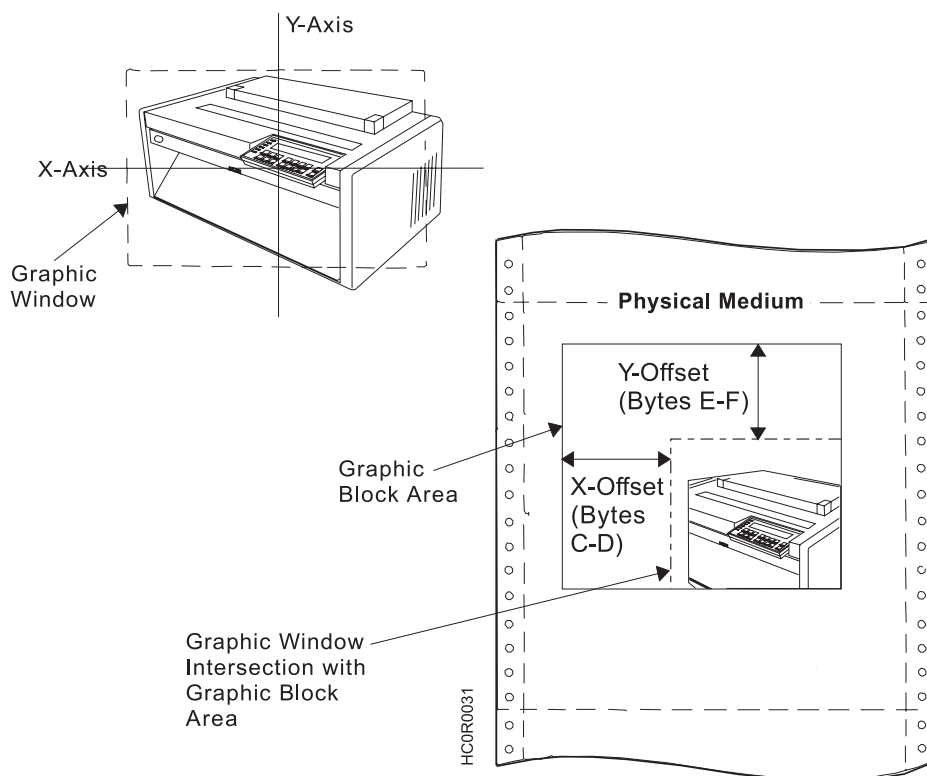


Figure 25. Position-and-Trim Mapping

Self-Describing Instructions

This portion of the Graphic Data Descriptor structured field contains zero or more self-describing instructions that set the drawing defaults for the graphics picture. The general format of a self-describing instruction is:

21	Length	Set	Mask	Default	Data
----	--------	-----	------	---------	------

The first byte, **21**, indicates that the following parameter is a Set Current Defaults instruction.

The **Length** byte is the length of the following data. If this value equals 4, the printer uses the standard default values.

The **Set** byte indicates the type of attribute or parameter this instruction is specifying.

The bits 0 through 15 in the **Mask** bytes correspond to attribute items within the indicated set. The individual set descriptions explain the meanings of these bits. When a mask bit equals one, the value of the default byte selects one of two options. See the default byte description for details. When a mask bit equals zero, the default does not change and the data does not include the value for the corresponding attribute.

The **Default** byte has a value of either 0F or 8F. A value of 0F sets all indicated items to their standard default values. A value of 8F and a mask bit equal to one requires the appropriate data for a new default to be defined in the data field for the corresponding attribute. Unreferenced data bytes not addressed by the mask field are ignored.

The **Data** bytes contain immediate data that specifies values for the attributes in this instruction. If the **Default** byte is 0F, these Data bytes are not present.

The **Set** byte specifies one of the following attributes or parameters:

Set Value	Description
00	Drawing Attributes
01	Line Attributes
02	Character Attributes
03	Marker Attributes
04	Pattern Attributes
0B	Arc Parameters

The following charts explain the meaning of the mask bits for each of the Set instructions. Refer to the drawing order descriptions for supported attribute values.

Drawing Attributes Set (Set = 00):

Mask Bit	Item Name	Length (Bytes)
0	Color	2
1-15	Reserved (Mask Bits = 0)	-

Line Attributes Set (Set = 01):

Mask Bit	Item Name	Length (Bytes)
0	Line Type	1
1	Line Width	1
2-15	Reserved (Mask Bits = 0)	—

Character Attributes Set (Set = 02):

Mask Bit	Item Name	Length (Bytes)
0	Angle X, Y	4
1	Cell size CW, CH	4
2	Direction	1
3	Precision	1
4	Symbol Set	1
5	Shear X, Y	4
6-15	Reserved (Mask Bits = 0)	—

Marker Attributes Set (Set = 03):

Mask Bit	Item Name	Length (Bytes)
0-1	Reserved (Mask Bits = 0)	–
2	Reserved (Mask Bits = 0)	–
3	Precision	1
4	Symbol Set	1
5-6	Reserved (Mask Bits = 0)	–
7	Marker Symbol	1
8-15	Reserved (Mask Bits = 0)	–

Pattern Attributes Set (Set = 04):

Mask Bit	Item Name	Length (Bytes)
0-4	Reserved (Mask Bits = 0)	–
5-6	Reserved (Mask Bits = 0)	–
7	Pattern Symbol	1
8-15	Reserved (Mask Bits = 0)	–

Arc Parameters Set (Set = 0B):

Mask Bit	Item Name	Length (Bytes)
0	P Value	2
1	Q Value	2
2	R Value	2
3	S Value	2
4-15	Reserved (Mask Bits = 0)	–

If the self-describing instructions do not specify a current default, the printer uses the standard graphic default for that parameter. The standard default values for the graphic segments are:

Description	Value
Color	Black
Line Type	Solid
Line Width	Normal
Character Angle	No Rotation
Character Cell	Standard Size (19 Dots High by 21 Dots Wide in 1/144 in. Units)
Character Direction	Left to Right
Character Set	Current Set (through the operator panel)
Character Font	NLQ Courier
Marker Symbol	Cross
Pattern Symbol	Solid Shading
Current Position	X, Y = 0, 0

Description	Value
Arc Parameters	P = Q = 1, R = S = 0
Foreground Mix	Overpaint
Background Mix	Leave Alone
Character Precision	Character Precision
Marker Precision	Character Precision
Marker Symbol Set	Resident Set in Printer

Note: Standard NLQ text character images (18 1/144 in. high by 20 1/200 in. wide) map to the standard size graphics character so that their upper left corners are coincident.

Write Graphics (WG)

Length	D685	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

BSI	One or More Drawing Orders
-----	----------------------------

The Write Graphics command transmits graphic data to the printer. The data in this command consists of picture segments that contain the drawing orders that define the picture in the graphic medium presentation space. Any number of Write Graphics commands may follow the Write Graphics Control command.

The Write Graphics command has a data length restriction of 32K. Within this data-length limit, the Write Graphics command can transmit partial segments, full segments, multiple segments, or any combination of these. Segments and drawing orders must be transmitted in the order in which they are to take effect.

When the printer encounters a partial segment, the printer expects the next graphics data to be the remainder of the segment. This condition is called graphics spanning. For a spanned segment, the segment length is the length of the entire segment before spanning. The Write Graphics command length is the actual number of bytes being transmitted in the current command.

The valid sequence for graphics spanning is as follows:

- Write Graphics command with zero or more segments, followed by the start of a partial segment
- Zero or more XOA, NOP, or STM commands
- A new Write Graphics command with a continuation of the partial segment, followed by zero or more segments.

All segments are run in deferred mode; drawing orders are included in the picture as they are received. The printer does not retain or store the segments. Receipt of the first segment starts the drawing process.

Begin Segment Introducer (BSI)

BSI	One or More Drawing Orders
-----	----------------------------

The Begin Segment Introducer precedes all of the drawing orders that are together in the graphic segment. The following chart shows the format of the BSI:

Decimal	Hex	Content	Description
0	0	70	Begin Segment Command

Decimal	Hex	Content	Description
1	1	0C	Length of the Following Parameters in BSI
2-5	2-5	NAME	Name of Segment (Printer ignores this field)
6	6	00	Reserved
7	7	Bit 0-2	Reserved (Must be Zeros)
		Bit 3	Prologue Flag 0 - No Prologue 1 - Prologue
		Bit 4	Reserved
		Bit 5-6	Segment Flags 00 - New Segment (Reinitialize Current Drawing Attributes) 11 - Append This Segment to the Previous Segment (Do Not Reinitialize Current Drawing Attributes)
		Bit 7	Reserved
8-9	8-9	LEN	Length of Created Segment
10-13	A-D	NAME	Predecessor/Successor Name (The Printer Ignores This Field)
14- <i>n</i>	E- <i>n</i>	ORDER	Drawing Order or Orders (The Number of Bytes in This Field Must Equal the Length Field, Bytes 8-9)

If bit 3 of byte 7 is on, a prologue is the first sequence of drawing orders in a new segment. The prologue, if present, is always at the beginning of a new segment's data and ends by an End Prologue order within the same segment.

If bits 5 and 6 of byte 7 are zero, the drawing attributes are re-initialized to the current default values. If bits 5 and 6 of byte 7 are equal to 11, this segment appends to the previous segment and the current drawing attributes do not reinitialize.

Drawing Orders: One or more drawing orders follow each Begin Segment Introducer. The format of a drawing order is:

Order Code

Order Code	Parameter(s)
------------	--------------

Order Code	Length	Parameter(s)
------------	--------	--------------

The order code specifies the type of graphics to print or the assigned drawing attribute.

The Length field, if present, is a one byte value that specifies the length of the drawing order following this byte. See the specific drawing orders for information about the length field.

The parameter bytes contain the specific characteristics for the drawing order. For information about the parameters, see the specific drawing orders, following this description.

Code	Drawing	Code	Drawing
00	No Operation	33	Set Character Cell Size
01	Comment	34	Set Character Angle
04	Reserved (Treated as a No-op)	38	Set Character Set
08	Set Pattern Set	39	Set Character Precision
0A	Set Color (Graphics)	3A	Set Character Direction
0C	Set Mix	3B	Set Marker Precision
0D	Set Background Mix	3C	Set Marker Set
11	Set Fractional Line Width	3E	End Prologue
18	Set Line Type	43	Reserved (Treated as a No-op)
19	Set Line Width	60	End Area
21	Set Current Position	68	Begin Area
22	Set Arc Parameters	71	End Segment (Treated as a No-op)
26	Set Extended Color	81	Line at Current Position
28	Set Pattern Symbol	82	Marker at Current Position
29	Set Marker Symbol	83	Character String at Current Position
85	Fillet at Current Position	C1	Line
87	Full Arc at Current Position	C2	Marker
91	Image at Current Position	C3	Character String
92	Image Data	C5	Fillet
93	End Image	C7	Full Arc
A1	Relative at Current Position	D1	Begin Image
		E1	Relative Line

The following sections describe the drawing orders.

No Operation

00

Description: This order is a no-operation; it has no effect on the graphic medium presentation space or any attribute or any current parameter.

Comment

01	L1	P1...P _n
----	----	---------------------

Description: This order is a no-operation; it has no effect on the graphic medium presentation space or any attribute or any current parameter. This order can appear anywhere within the segment.

L1 is the length byte. This byte is a value between 1 and 255 and specifies the number of data bytes that follow. Parameters P1 to P_n are the data bytes. The printer ignores the data within the order. However, there must be at least one data byte within this order.

Segment Characteristics

04	L1	P1...P _n
----	----	---------------------

Description: This order is for compatibility with existing products and is a No Operation order.

Set Pattern Set

08	P1
----	----

Description: This order sets the value of the current pattern set attribute. Parameter byte P1 has the following value:

00 Pattern default

Set Color

0A	P1
----	----

Description: This order sets the value of the current graphic color attribute. The color for non-graphics (for example, text) does not change with this order. The color attribute applies to all following graphic drawing orders until another Set Color order or Set Extended Color order occurs or until a new graphic segment initializes the graphic attributes. This order does not change any other graphic drawing attributes.

Parameter P1 specifies the color, as follows:

Hex	Color (See note)
00	Current Default
07	Black
08	Color of Medium

Note: The 4247 Printer provides Limited Simulated Color Support. All architecturally defined color values for graphics data are accepted and result in simulation of the specified colors without generation of unsupported color exceptions. All valid colors not listed in the above table (X'01' through X'06') are simulated by printing in black.

If the color requested is not available, the printer uses black. If this occurs, the Exception Handling Control determines whether to report this condition. The EHC also determines whether to continue with the Write Graphics command.

For all color selections except the color of the medium, graphics prints in black. These selections overpaints previous graphics (if of a different color) by changing the color of the dots to print. For a color of medium selection, following graphics overpaints previous graphics by deleting (erasing) the dots to print.

Set Mix

0C	P1
----	----

Description: This order sets the value of the current mix attribute. The mix controls the way that the printer combines the color of the foreground with the color of the medium presentation space. Parameter byte P1 contains the value of the current mix attribute. The only valid values for this byte are:

00 Use the default (overpaint)

02 Overpaint - The color attribute value of the foreground replaces the color attribute value of the graphics medium presentation space.

Set Background Mix

0D	P1
----	----

Description: This order sets the value of the background mix. The background mix controls the way the printer combines the color of the background with the color of the graphics medium presentation space. Parameter byte P1 contains the value of the current mix attribute. The only valid values for this byte are:

00 Use the default (leave alone)

05 Leave Alone - The color attribute value of the medium presentation space does not change.

Set Fractional Line Width

11	02	P1	P2
----	----	----	----

Description: The Set Fractional Line Width order sets the line width attribute. This order changes only the line width attribute. The printer uses the last line width received, no matter which order, Fractional Line Width Order or Set Line Width, sets the line width. Parameters P1 and P2 form a two byte sequence that specifies the line width, as follows:

Hex Value	Line Width
0000	Current Default
0001 - 017FF	Normal Line (One Dot Wide)
0180 - FFFF	Thick Line (Two Dots Wide)

This order aids graphics interchange capability. See also “Set Line Width” on page 164.

Set Line Type

18	P1
----	----

Description: The Set Line Type order sets the value of the current line type attribute. This order does not change any other graphic drawing order attributes.

Parameter P1 specifies the type of line for the graphic output. The following values are valid for P1:

Hex	Line Type
00	Current Default
01	Dotted Line
02	Short Dashed Line
03	Dash-Dot Line
04	Double Dotted Line
05	Long Dashed Line
06	Dash-Double Dot Line
07	Solid Line
08	Invisible Line

Set Line Width

19	P1
----	----

Description: The Set Line Width order specifies the line width for subsequent graphics. This order changes the fractional line width attribute only. The printer uses the last line width received, no matter which order, Set Fractional Line Width Order or Set Line Width, sets the line width. Parameter P1 specifies the width of the line for the graphic output. The following values are valid for P1:

Hex	Line Type
00	Current Default
01	Normal Line (One Dot Wide)
02-FF	Thick Line (Two Dots Wide)

Set Current Position

21	04	P1-P4
----	----	-------

Description: This order sets the current graphics position for a subsequent drawing order. The position for non-graphics (for example, text) does not change.

Parameters P1 and P2 form a two byte value that specifies the X coordinate in drawing units. Parameters P3 and P4 form a two byte value that specifies the Y coordinate in drawing units. The printer resolves the coordinates to the nearest increment of 0.18 mm (0.007 in. [1/144 in.]).

Set Arc Parameters

Description: This order specifies the parameters for a full arc (circle or ellipse), which the Full Arc orders use.

The center of this circle or ellipse is the origin (coordinate 0,0). The circle or ellipse is drawn in a counterclockwise direction. Parameters P1 to P8 form four two byte values that specify the coordinates of the major and minor axis ends, as follows:

P1P2 - The X coordinate of the major axis end

P3P4 - The Y coordinate of the minor axis end

P5P6 - The X coordinate of the minor axis end

P7P8 - The Y coordinate of the major axis end.

For an ellipse:

$$(P1P2) \times (P5P6) + (P3P4) \times (P7P8) = 0$$

For a circle of radius r , the parameters are:

$$P1P2 = P3P4 = r, P5P6 = P7P8 = 0$$

For an ellipse with major axis a and minor axis b , the parameters are:

$$P1P2 = a, P3P4 = b, P5P6 = P7P8 = 0$$

For the above ellipse, tilted at an angle A to the X axis, the parameters are:

$$P1P2 = a \cos(A)$$

$$P3P4 = b \cos(A)$$

$$P5P6 = -b \sin(A)$$

$$P7P8 = a \sin(A)$$

This order does not change any other graphic drawing attributes.

Set Extended Color

26	02	P1	P2
----	----	----	----

Description: This order functions the same as the Set Color order except that it specifies a length field and the color parameter contains two bytes. The color for non-graphics (for example, text) does not change with this order. This order does not change any other graphic drawing attributes.

This order aids graphics interchange compatibility.

Parameters P1 and P2 form a two byte value that specifies the color, as follows:

Hex	Line Type
0000	Current Default
0008	Black
FF00	Black
FF07	Black
FF08	Color of Medium

Note: The 4247 Printer provides Limited Simulated Color Support. All architecturally defined color values for graphics data are accepted and result in simulation of the specified colors without generation of unsupported color exceptions. All valid colors not listed in the above table (X'0001' through X'0007', X'0009' through X'0010', and X'FF01' through X'FF06') are simulated by printing in black.

For all color selections except the color of the medium, graphics prints in the selected color. These selections overpaint previous graphics (if of a different color) by changing the color of the dots to be printed. For a color of medium selection, following graphics overpaints previous graphics by deleting (erasing) the dots to print.

Set Pattern Symbol

28	P1
----	----

Description: This order sets the value of the current shading pattern attribute for subsequent area shading. For additional information, see “Begin Area” on page 169 and “End Area” on page 168.

Parameter P1 specifies the pattern attribute value. This value determines which particular pattern from the pattern symbol set the printer uses to shade (fill) the interior of subsequent areas. The pattern attribute values are:

Hex	Line Type
00	Current Default
01 - 08	Density 1 to Density 8 (Decreasing)
09	Vertical Lines
0A	Horizontal Lines
0B	Diagonal Lines 1 (Bottom Left to Top Right)
0C	Diagonal Lines 2 (Bottom Left to Top Right)
0D	Diagonal Lines 1 (Top Left to Bottom Right)
0E	Diagonal Lines 2 (Top Left to Bottom Right)

Hex	Line Type
0F	No Shading
10	Solid Shading
40	Blank

Set Marker Symbol

29	P1
----	----

Description: This order sets the value of the current marker symbol attribute for subsequent markers. See “Marker” on page 174 and “Marker at Current Position” on page 170 orders.

Parameter P1 specifies the marker symbol attribute value. This value determines which marker from the marker symbol set the printer uses for subsequent orders. The following are the marker symbol values:

Hex	Line Type
00	Current Default
01	Cross
02	Plus
03	Diamond
04	Square
05	Six Point Star
06	Eight Point Star
07	Filled Diamond
08	Filled Square
09	Dot
0A	Small Circle
40	Blank

Set Character Cell Size

33	04	P1-P4
----	----	-------

or

21	08	P1-P8
----	----	-------

Description: This order specifies the size of the character cell for output characters with subsequent Character String orders. The character cell size for non-graphics (for example, text) does not change with this order. The Set Character Cell order does not change any other graphic drawing attributes.

There are two types of formats with this order. The first format has a length of 4 and has four parameter bytes. The second format has a length of 8 and has eight parameter bytes.

For both formats, parameters P1P2 form a two byte value that specifies the width of the character in drawing units. Parameters P3P4 form a two byte value that specifies the height of the character in drawing units.

For the second format, the width and height of the character cell contain both integer and fractional values. Parameters P5P6 form a two byte value that specifies the fractional portion of the width of the character in drawing units. Parameters P7P8 form a two byte value that specifies the fractional portion of the height of the character in drawing units. There is an implied decimal point between P1P2 and P5P6, and between P3P4 and P7P8.

The printer pads the standard graphics character cell with spaces to achieve the desired spacing. The printer also adjusts the character size within the specified cell in integer multiples of the standard size graphics character. The minimum character image (resulting from graphics mapping) is the standard size graphics character, even though the scaled character cell may be smaller. In this case, overlapping of characters may occur.

Note: The printer clips the expanded graphics representation of the last vertical column of a downloaded NLQ character (see Load Symbol Sets).

Set Character Angle

34	04	P1-P4
----	----	-------

Description: This order specifies the angle of the baseline of graphic character strings that print using subsequent character string orders. The non-graphics (for example, text) character angle does not change with this order. Angles of 0, 90, 180, and 270 degrees are valid. This order does not change any other graphic drawing order attributes.

Parameters P1 and P2 form a two byte value that specifies the X coordinate. Parameters P3 and P4 form a two byte value that specifies the Y coordinate. To meet the requirement that the angle be 0, 90, 180, or 270 degrees, either the X or the Y coordinate must equal zero, as follows:

- If $X > 0$ and $Y = 0$, then the angle is zero degrees (default).
- If $X = 0$ and $Y > 0$, then the angle is 90 degrees.
- If $X < 0$ and $Y = 0$, then the angle is 180 degrees.
- If $X = 0$ and $Y < 0$, then the angle is 270 degrees.
- If $X = 0$ and $Y = 0$, then the angle is zero degrees.

If neither the X nor the Y coordinate is zero, the printer uses the current default for this drawing order.

Set Character Set

38	P1
----	----

Description: This order sets the value of the current character set attribute. The character set specified by this command must use an NLQ font if printing high-density graphics or a DP font if printing low-density graphics. Downloaded DP characters are not supported in graphics.

Parameter P1 specifies the local character set identifier. A value of 0 or X'FF' selects the current drawing default. A value of X'01' to X'FE' selects a local ID for the character set. This local ID is mapped to a global font ID by the Load Font Equivalence command. See "Load Font Equivalence (LFE)" on page 107.

Set Character Precision

39	P1
----	----

Description: This order sets the value of the current character precision attribute. Parameter P1 specifies the type of precision. Precision 2 (character precision) is the only valid type of precision for this printer. P1 must equal 01 or 02. P1 set to X'00' is the current default.

Set Character Direction

3A	P1
----	----

Description: This order sets the value of the character direction attribute. Subsequent strings that print using the Character String order will print in the direction specified relative to the character baseline angle. See “Set Character Angle” on page 167. The character direction for non-graphics (text) does not change with this order. This order does not change any other graphic drawing attributes.

Parameter P1 specifies the direction, as shown:

Hex	Line Type
00	Current Default
01	Left to Right
02	Top to Bottom
03	Right to Left
04	Bottom to Top

Set Marker Precision

3B	P1
----	----

Description: This order sets the value of the current marker precision attribute. Parameter P1 specifies the type of precision. Precision 2 (character precision) is the only valid type of precision for this printer. P1 must equal 01 or 02.

Set Marker Set

3C	P1
----	----

Description: This order sets the value of the current marker symbol set attribute. Parameter P1 specifies the local character set identifier. This printer only uses the default marker set. Thus, P1 must equal 00.

End Prologue

3E	P1
----	----

Description: This order ends the prologue section of a segment. It is only valid if the prologue flag bit is on in the Begin Segment Introducer (BSI). When the BSI prologue flag bit is on, only the following orders are valid before the End Prologue order:

- Comment
- No Operation
- Segment Characteristics
- All Set Attribute type orders.

End Area

80	L1	P1-Pn
----	----	-------

Description: This order indicates the end of the boundary of an area specified with a Begin Area order. This order does not change any other graphic drawing attributes. However, orders between a Begin Area/End Area pair can update the current position.

L1 is the length of the data, P1 to Pn. If no data is present, the length is zero.

Parameters P1 to Pn are optional data bytes, and if present, must be zeros.

Within the area boundaries, one or more closed figures can exist. A figure ends either by an End Area order or by a order specifying a coordinate that implies the start of a new closed figure. These orders include a Line, Relative Line, Arc, Full Arc, Fillet, or Set Current Position order.

Each closed figure should close properly; its start and end points should be identical. If not, the figure closes arbitrarily with a straight line connecting the start and end points.

Begin Area

68	P1
----	----

Description: This order indicates the beginning of the boundary of an area that the printer shades. The area definition must terminate with an End Area order.

The area boundaries consist of one or more closed figures. Each closed figure is made up of a continuous set of straight lines, full arcs, and fillets defined using the Line at Current Position, Fillet at Current Position, and Full Arc at Current Position orders. The pattern symbol and the shading color for the area are the attribute values that are current prior to the Begin Area order. Only the following orders are valid between a Begin Area and an End Area order:

- Comment
- Line or Relative Line
- Line at Current Position
- Relative Line at Current Position
- Set Arc Parameters
- Full Arc at Current Position
- Full Arc or Fillet
- Fillet at Current Position
- Set Color or Set Extended Color (see note)
- Set Line Type, Set Line Width, or Set Fractional Line Width (see note)
- Set Current Position.

Note: When used between Begin Area and End Area drawing orders, the orders Set Color, Set Extended Color, Set Line Type, Set Line Width, and Set Fractional Line Width update the values of their respective current attributes only for the Area boundary, if drawn. These orders do not update their respective current values for the area fill pattern after an area has begun.

Use of the Line, Relative Line, Full Arc, and Fillet in the non At Current Position form can cause the printer to arbitrarily close the area figure. The recommended orders to use within an area definition are those in the At Current Position form.

The printer cannot nest Area orders. The Begin Area order does not change any other graphic drawing attributes. However, orders between a Begin Area/End Area pair can update the current position.

Parameter **P1** is a **flag** byte that specifies whether boundary lines are to be drawn, as shown:

Bit 0	Reserved
-------	----------

Bit 1	0 = Do Not Draw Boundary Lines 1 = Draw Boundary Lines
Bits 2-7	Reserved

The printer uses the current values of color, mix, background mix, pattern, and pattern set when shading the area. If boundary lines are drawn, the printer uses the current values of graphics color, line type, and line width. The printer shades any commented region with an odd number of line crossings from infinity. This shading uses the current values of pattern symbol, color, mix, and background mix from the Begin Area order. The printer will not shade regions with an even number of line crossings from infinity. The printer counts all coincident boundary lines when counting line crossings.

The current position is the last coordinate value of the preceding drawing order. The Set Current Position order can move the current position to any drawing order coordinate within the limits of the GDD defined medium presentation space window.

Note: When filled areas are drawn such that some boundaries coincide, it is recommended that they be drawn with the same value for Parameter P1 so that the area boundary is drawn properly.

Line at Current Position

81	L1	P1-P _n
----	----	-------------------

Description: This order specifies one or more connected lines. The printer draws a line from the current graphics position to the points specified by the first set of X and Y coordinates in the parameters. The printer then draws additional lines from the previous end point to the next coordinate pair, if additional coordinates are present.

The printer uses the current attributes for color, mix, line type, and line width in drawing the lines.

L1, the length, specifies the number of bytes following this byte. The value of L1 must be a multiple of four. If L1 is zero, no line is drawn.

Parameters P1 to P_n, if present, form two byte values that specify the X and Y coordinates of the end points for a series of connected lines. This order updates the current graphics position to the last line end point. If the order does not specify any points, the current graphics position does not change. P1 and P2 form a two byte sequence that specifies the X coordinate of the second end point. P3 and P4 form a two byte sequence that specifies the Y coordinate of the second end point. Additional X and Y coordinates, if present, are specified in the remaining parameters, following the same format.

Marker at Current Position

82	L1	P1-P _n
----	----	-------------------

Description: This order specifies one or more marker symbols, which the printer places at the points specified by a pair of X and Y coordinates, beginning with the current graphics position. The Set Marker Symbol order determines the marker that prints.

L1, the length, specifies the number of bytes following this byte. The value of L1 must be a multiple of four. A value of zero for L1 is valid and results in only one marker symbol being drawn at the current graphics position.

Parameters P1 to P_n, if present, form two byte values that specify the X and Y coordinates for each additional marker symbol. The printer draws the first marker symbol at the current graphics position. P1

and P2 form a two byte value that specifies the second X coordinate. P3 and P4 form a two byte value that specifies the second Y coordinate. Any remaining parameters specify additional coordinate values for additional markers, using the same format.

The printer uses the current values of color, mix, background mix, marker, precision marker set, and marker symbol for drawing the marker.

This order updates the current graphics position to the value of the last point coordinates. If this order does not specify any points, the current graphics position will not change.

Note: The marker cell size is constant 3 mm (0.12 in. [17/144 in.]). The scaling factor used in defining a graphics area does not affect the size of the marker. If markers are used near the edge of a defined graphics area, scaling the graphics may result in the markers being clipped from the printable graphics area.

Character String at Current Position

83	L1	P1-Pn
----	----	-------

Description: This order draws a character string, starting at the current graphics position. A previous Set Character Set order specifies the font to use for drawing the character string. If no previous Set Character Set order has been processed, the printer uses the drawing default character set.

The printer uses the current values of color, mix, background mix, and character precision when drawing the string. The Set Character Cell, Set Character Angle, and Set Character Direction orders determine the character size, character angle, and character direction, respectively.

L1 is a one-byte value that specifies the length of the character string. If L1 is zero, no character string is drawn.

Parameters P1 to Pn, the character string, are one-byte values that specify the code points (characters) of the character string to be drawn, using the currently active character set.

Fillet at Current Position

85	L1	P1-Pn
----	----	-------

Description: This order specifies a curved line that the printer draws tangential to a specified set of connected, imaginary, straight lines. The printer uses the current graphics position for the first point and the parameter (or parameters) specifies additional points to use.

The printer joins the points specified by imaginary straight lines. The printer then fits a curve to the lines, as follows:

- The curve is tangent to the first line at the start point and to the last line at its end point.
- If there are intermediate lines, the curve is tangent to these lines at their center points.

L1 specifies the length of the parameter (or parameters) in this order. The value of L1 must be a multiple of four. A value of zero for L1 is invalid.

The first end point for the imaginary line specifying the fillet is the graphics current position. Parameters P1 to Pn form two byte values that specify additional X and Y coordinates. These coordinates are additional, sequential end points of the imaginary lines specifying the fillet.

The printer uses the current values of color, mix, line type, and line width when drawing the fillet.

This order updates the current graphics position to the coordinates of the last point.

Full Arc at Current Position

87	02	P1	P2
----	----	----	----

Description: This order specifies a full arc (circle or ellipse) with the center at the current graphics position. A previous Set Arc Parameters order determines the shape and orientation of the arc. If no Set Arc Parameters order has been received, then the printer draws an arc using the default values of the arc parameters.

Parameters P1 and P2 form a two byte value that specifies the scale. P1 specifies the integer portion of the scale; P2 specifies the fractional portion of the scale (P2 divided by 256). For example, if P2 equals X'40', the decimal value of P2 is 64. This value (64) divided by 256 equals the fraction one-fourth.

The scale value acts as a multiplier for the arc parameters. For a circle, the radius is $P1P2 \times r$. A previous Set Arc Parameters order specifies the value of r .

For an ellipse: The major axis is $P1P2 \times a$, the minor axis is $P1P2 \times b$, and a previous Set Arc Parameters order specifies the values for a and b .

The printer uses the current values of color, mix, line type, and line width when drawing the arc.

This order does not update the current graphics position.

Begin Image at Current Position

91	06	P1-P6
----	----	-------

Description: This order defines an image, with the top left corner of the image at the current graphics position. An image consists of a rectangular region with a resolution of one pel, defined in increments of 0.18 mm (0.007 in. [1/144 in.]). Each pel, therefore, represents one dot in the printed image. One or more Image Data orders follow the Begin Image at Current Position order. The Image Data orders contain the image data itself. The Begin Image at Current Position order introduces a graphics image. Only Image Data, Comment, or No-op orders are valid between Begin Image and End Image orders.

Parameters P1 and P2 are always zero for this order. Parameters P3 and P4 form a two byte value that specifies the width of the image in increments of 0.18 mm (0.007 in. [1/144 in.]). Parameters P5 and P6 form a two byte value that specifies the height of the image in increments of 0.18 mm (0.007 in. [1/144 in.]).

The printer uses the current values of color and mix when drawing the image.

Note: The Begin Image at Current Position order always specifies the width and height of the image in increments of 0.18 mm (0.007 in. [1/144 in.]), not in drawing units.

Image Data

92	L1	P1-Pn
----	----	-------

Description: This order specifies the image data for all or part of an image introduced by a Begin Image order. A Begin Image order must precede an Image Data order.

L1 is a one-byte value that specifies the length (in bytes) of the image data that follows. Valid values for L1 are X'00' through X'FF'.

Parameters P1 to P n are values that specify the image dot data, a zero indicating the absence of a dot, a one indicating the presence of a dot. The dots are 0.18 mm (0.007 in. [1/144 in.]) apart horizontally and vertically.

The image data is in the form of horizontal scan lines (rows), left to right. Each Image Data order specifies only one scan line (row) of the image. Therefore, the number of Image Data orders following a Begin Image order must be equal to the value specified in parameters P5 and P6 (the image height) of the Begin Image order.

Each of the parameters, P1 to P n , of the Image Data order specifies eight dots. Therefore, parameter L1 of the Image Data order must equal the image width divided by eight. Parameters P3 and P4 of the Begin Image order specify the image width. If the image width is not a multiple of eight, the printer ignores any extra dots specified by bits in the last parameter, P n .

Note: The image data specified in the Image Data Orders between a Begin Image and End Image pair must exactly fill the area specified by the width and height of the Begin Image order.

This order does not update the current graphics position.

End Image

93	L1	P1-P n
----	----	----------

Description: This order defines the end of an image. A Begin Image order and zero or more Image Data orders must precede the End Image order.

L1, the length, is a one-byte value that specifies the number of parameter bytes that follow. If no parameter bytes follow, L1 is zero.

Parameters P1 to P n are optional. The printer does not use these parameters; if they are present, the printer discards them.

This order does not update the current graphics position.

Relative Line at Current Position

A1	L1	P1-P n
----	----	----------

Description: This order specifies one or more connected straight lines, like the Line at Current Position order. With this order, the end point of each line is an offset from the previous end point, rather than an absolute coordinate pair.

L1 is a one-byte value that specifies the length of the parameter field. L1 must be a multiple of two. The printer will not draw a line if L1 is zero.

Parameters P1 to P n are signed, twos-complement, one-byte values that specify the offset, in drawing units. The first line end point is the graphics current position. P1 specifies the X coordinate for the second point as an offset from the first point. P2 specifies the Y coordinate for the second point as an offset from the first point. The remaining parameters, if present, specify additional X and Y coordinate values, as offsets from each previous end point, following the same format.

The printer uses the current values of color, mix, line type, and line width when drawing the line.

This order updates the current graphics position to the coordinates of the last end point. If there are no offsets in this order, the current graphics position does not change.

Line

C1	L1	P1-Pn
----	----	-------

Description: This order specifies one or more connected lines.

L1 is a one-byte value that specifies the length of the parameter field that follows. The value of L1 must be a multiple of four and cannot be zero. If L1 equals four, no line is drawn, but the printer updates the graphics current position to the points specified by parameters P1 to P4.

Parameters P1 and P2 form a two byte value that specifies the first X coordinate point. Parameters P3 and P4 form a two byte value that specifies the first Y coordinate point. Parameters P5 to P8, if present, specify the second X and Y coordinate points. The printer draws a line from the point specified by the first pair of coordinates to the point specified by the second pair of coordinates. If additional coordinate pairs are present, the printer draws additional lines from the previous end point to the next coordinate pair.

This order uses the current values of color, mix, line type, and line width.

Following this order, the printer updates the graphics current position to the last end point specified in the order.

Marker

C2	L1	P1-Pn
----	----	-------

Description: This order specifies one or more marker symbols to place at the points specified by pairs of coordinates. The specified location is the center of the marker.

A previously specified Set Marker Symbol order determines the marker symbol the printer uses. If no previous Set Marker Symbol order was processed, the printer uses the current graphics default marker symbol. The printer uses the current values of color, mix, background mix, marker precision, marker set, and marker symbol when drawing the markers.

L1 is a one-byte value that specifies the length of the parameter field that follows. The value of L1 must be a multiple of four. If L1 equals zero, the printer does not draw a marker.

Parameters P1 and P2 form a two byte value that specifies the X coordinate point for the first marker. Parameters P3 and P4 form a two byte value that specifies the Y coordinate point for the first marker. Parameters P5 to Pn, if present, specify the X and Y coordinate points for additional markers.

This order updates the current graphics position to the coordinates of the last end point.

Note: The marker cell size is constant 3 mm (0.12 in. [17/144 in.]). The scaling factor used in defining a graphics area does not affect the size of the marker. If markers are used near the edge of a defined graphics area, scaling the graphics may result in the markers being clipped from the printable graphics area.

Character String

C3	L1	P1-Pn
----	----	-------

Description: This order draws a character string starting at the specified location. A previous Set Character Set order specifies the font to use for drawing the character string. If no previous Set Character Set order was processed, the printer uses the drawing default character set.

The printer places the character cell of the first character in the string at the specified graphics position. The Set Character Cell, Set Character Angle, and Set Character Direction orders determine the character size, character angle, and character direction, respectively. The printer uses the current values of color, mix, background mix, and character precision when drawing the string.

L1 is a one-byte value that specifies the length of the parameter field that follows. L1 must be greater than or equal to four. If L1 equals four, the printer does not draw the character string, but the printer updates the graphics current position to the point specified by parameters P1 to P4.

Parameters P1 and P2 form a two byte value that specifies the X coordinate of the starting location. Parameters P3 and P4 form a two byte value that specifies the Y coordinate of the starting location. Parameters P5 to P_n, if present, are one-byte values that specify the code points of the character string, using the currently active character set.

This order updates the current graphics position to the coordinates of the last point.

Fillet

C5	L1	P1-P _n
----	----	-------------------

Description: This order specifies a curved line, which the printer draws tangential to a specified set of connected, imaginary, straight lines.

The printer joins the points specified in the order by imaginary straight lines. The printer then fits a curve to the lines. The curve is tangent to the first line at the start point and is tangent to the last line at its end point. If there are intermediate lines, the curve is tangent to these lines at their center points.

L1 is a one-byte value that specifies the length of the following parameters. L1 must be a multiple of four and cannot equal zero. If L1 equals four, the printer does not draw the fillet, but the printer updates the graphics current position to the point specified by parameters P1 to P4.

Parameters P1 and P2 form a two byte value that specifies the X coordinate of the first point. Parameters P3 and P4 form a two byte value that specifies the Y coordinate of the first point. Parameters P5 to P_n, if present, form two byte values that specify the corresponding coordinate values for additional points. If only two points are specified, the printer draws a straight line.

The printer uses the current values of color, mix, line type, and line width when drawing the fillet.

This order updates the current graphics position to the coordinates of the last point.

Full Arc

C7	L1	P1-P _n
----	----	-------------------

Description: This order specifies a full arc (circle or ellipse) with the center at the specified point. A previous Set Arc Parameters order determines the shape and orientation of the arc. If no previous Set Arc Parameters order was processed, the printer draws the arc using the graphics default arc parameters.

Parameters P1 and P2 form a two byte value that specifies the X coordinate for the center of the arc. Parameters P3 and P4 form a two byte value that specifies the Y coordinate for the center of the arc. Parameters P5 and P6 form a two byte, unsigned, floating point value that specifies the scale. P5 specifies the integer portion of the scale; P6 specifies the fractional portion of the scale. There is an implied decimal point between P5 and P6. Byte P6 represents the fraction given by the value of P6 divided by 256 (see "Full Arc at Current Position" on page 6-88).

The scale value acts as a multiplier for the arc parameters, as follows:

For a circle: The radius is $P5P6 \times r$. A previous Set Arc Parameters order specifies the value of r . For an ellipse: The major axis is $P5P6 \times a$ and the minor axis is $P5P6 \times b$.

A previous Set Arc Parameters order specifies the values for a and b . The printer uses the current values of color, mix, line type, and line width when drawing the arc.

This order does not update the current graphics position.

Begin Image

D1	0A	P1-P10
----	----	--------

Description: This order defines an image at the graphics position specified by parameters P1 to P4. An image consists of a rectangular region defined in increments of 1/144 in. One or more Image Data orders follow the Begin Image order. The Image Data orders contain the image data itself. The Begin Image order introduces a graphics image. Only Image Data, Comment, or No-op orders are valid between Begin Image and End Image orders.

Parameters P1 and P2 form a two byte value that specifies the X coordinate for the start of the image. Parameters P3 and P4 form a two byte value that specifies the Y coordinate for the start of the image. Parameters P1 to P4 define the location of the top left corner of the image. Parameters P5 and P6 are always zero for this order. Parameters P7 and P8 form a two byte value that specifies the width of the image in increments of 1/144 in. Parameters P9 and P10 form a two byte value that specifies the height of the image in increments of 1/144 in.

The printer draws the image in the current values of color and mix.

This order updates the current graphics position to the coordinates of the image (parameters P1 to P4).

Notes:

1. The Begin Image at Current Position order always specifies the width and height of the image in increments of 1/144 in., not in drawing units.
2. By sending the image ordered (immediate) instead of unordered (deferred), the printer uses less storage.

Relative Line

E1	L1	P1-Pn
----	----	-------

Description: This order specifies one or more connected straight lines, like the Line order, except that the end point of each line is an offset from the previous end point.

L1 is a one-byte value that specifies the length of the parameter field that follows. A value of zero for L1 is invalid; L1 must be a multiple of 2. If the value of L1 is two, the printer does not draw the line. However, the printer does update the graphics current position to the point specified by P1 and P2.

Parameters P1 to Pn are signed, twos-complement, one-byte values that specify the offset in drawing units. Parameters P1 and P2 form a two byte value that specifies the X coordinate of the first end point of the line. Parameters P3 and P4 form a two byte value that specifies the Y coordinate of the first end point of the line. Parameter P5 is a signed, twos-complement, one-byte value that specifies the X coordinate of the second end point as an offset from the first end point. Parameter P6 is a signed, twos-complement,

one-byte value that specifies the Y coordinate of the second end point as an offset from the first end point. The remaining parameters, if present, specify additional X and Y coordinate values as offsets from the previous point, following the same format.

The printer draws the line in the current values of color, mix, line type, and line width.

This order updates the current graphics position to the coordinates of the last offset point. If there are no offset points with this order, the current graphics position does not change.

End (END)

For a description of the End control, see “End (END)” on page 114.

Related Drawing Orders

The following list contains drawing orders that relate to a selected order. That is, when defining parameters for a specific order, the additional orders in the list are also affected or should be considered.

Table 6. Related Drawing Order

Set Color	Set Extended Color Line, Line at Current Position Fillet, Fillet at Current Position Begin Area, End Area Full Arc, Full Arc at Current Position Begin Image Begin Image at Current Position Image Data, End Image Marker, Marker at Current Position Character String Character String at Current Position Relative Line Relative Line at Current Position
Set Fractional Line Width	Set Line Width Line, Line at Current Position Fillet, Fillet at Current Position Full Arc, Full Arc at Current Position Begin Area, End Area Relative Line Relative Line at Current Position
Set Line Type	Line, Line at Current Position Fillet, Fillet at Current Position Full Arc, Full Arc at Current Position Begin Area, End Area Relative Line Relative Line at Current Position
Set Line Width	Set Fractional Line Width Line, Line at Current Position Fillet, Fillet at Current Position Full Arc, Full Arc at Current Position Begin Area, End Area Relative Line Relative Line at Current Position

Table 6. Related Drawing Order (continued)

Set Current Position	Line at Current Position Fillet at Current Position Full Arc at Current Position Begin Image at Current Position Marker at Current Position Character String at Current Position Relative Line at Current Position
Set Arc Parameters	Full Arc, Full Arc at Current Position
Set Extended Color	Set Color Line, Line at Current Position Fillet, Fillet at Current Position Begin Area, End Area Full Arc, Full Arc at Current Position Begin Image Begin Image at Current Position Image Data, End Image Marker, Marker at Current Position Character String Character String at Current Position Relative Line Relative Line at Current Position
Set Pattern Symbol	Begin Area, End Area
Set Marker Symbol	Marker Marker at Current Position
Set Character Cell Size	Set Character Angle (Related to Cell Size, Not affected by It) Set Character Direction (Related to Cell Size, Not affected by It) Character String Character String at Current Position
Set Character Angle	Set Character Cell Size (Related to Character Angle, Not affected by It) Set Character Direction (Related to Character Angle, Not affected by It) Character String Character String at Current Position
Set Character Direction	Set Character Angle (Related to Character Direction, Not affected by It) Set Character Cell Size (Related to Character Direction, Not affected by It) Character String Character String at Current Position
End Area	Set Color, Set Extended Color Set Pattern Symbol Begin Area Set Line Type Set Line Width Set Fractional Line Width
Begin Area	Set Color, Set Extended Color Set Pattern Symbol Set Line Type Set Line Width Set Fractional Line Width End Area

Table 6. Related Drawing Order (continued)

Line at Current Position	Line, Relative Line Relative Line at Current Position Set Line Type Set Line Width Set Fractional Line Width Set Color Set Extended Color Set Current Position
Marker at Current Position	Marker Set Marker Symbol Set Color, Set Extended Color Set Current Position
Character String at Current Position	Character String Set Character Direction Set Character Angle Set Character Cell Size Set Color, Set Extended Color Set Current Position
Fillet at Current Position	Fillet Set Color, Set Extended Color Set Line Type Set Line Width Set Fractional Line Width Set Current Position
Full Arc at Current Position	Full Arc Set Arc Parameters Set Color, Set Extended Color Set Line Type Set Line Width Set Fractional Line Width Set Current Position
Begin Image at Current Position	Begin Image Set Color, Set Extended Color Image Data End Image Set Current Position
Image Data	Begin Image Begin Image at Current Position Set Color, Set Extended Color End Image
End Image	Begin Image Begin Image at Current Position Image Data Set Color, Set Extended Color
Relative Line at Current Position	Line, Relative Line Line at Current Position Set Line Type Set Line Width Set Fractional Line Width Set Current Position Set Color, Set Extended Color

Table 6. Related Drawing Order (continued)

Line	Line at Current Position Relative Line Relative Line at Current Position Set Line Type Set Line Width Set Fractional Line Width Set Color Set Extended Color
Marker	Marker at Current Position Set Marker Symbol Set Color, Set Extended Color
Character String	Character String at Current Position Set Character Direction Set Character Angle Set Character Cell Size Set Color, Set Extended Color
Fillet	Fillet at Current Position Set Color, Set Extended Color Set Line Type Set Line Width Set Fractional Line Width
Full Arc	Full Arc at Current Position Set Arc Parameters Set Color, Set Extended Color Set Line Type Set Line Width Set Fractional Line Width
Begin Image	Begin Image at Current Position Set Color, Set Extended Color Image Data End Image Set Current Position
Relative Line	Line Relative Line at Current Position Line at Current Position Set Line Type Set Line Width Set Fractional Line Width Set Current Position Set Color, Set Extended Color

Bar Code Function Set Commands

The bar code function set contains the commands and controls for presenting bar code information on a logical page, a page segment, or an overlay area on the physical medium. The following commands are the bar code function set:

Command	Code	Description
WBCC	D680	Write Bar Code Control
WBC	D681	Write Bar Code
END	D65D	End

The following pages describe the bar code function set commands.

Write Bar Code Control (WBCC)

Length	D680	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

BCAP	BCOC	BCDD
------	------	------

The Write Bar Code Control command causes the printer to enter the bar code block state in the current page, overlay, or page segment state. The parameters of this command define the size, placement, and orientation of the bar code block. Parameters in this command also establish the initial conditions for interpreting the bar code data.

Note: The quality of the bar code output is affected by the bar code mode and direction parameter values selected at the operator panel (see the *User's Guide* for your model printer), and by the Print Quality Control command (see "Print Quality Control (PQC)" on page 132).

A bar code block contains one or more bar code symbols with or without human readable interpretation of the bar encoded information. Because an important application of bar code printing is printing bar code symbols on labels, means are provided in the function set to repeat symbols. The repeated symbols must be of the same type, but the length and content of the variable data can be different. General parameters applying to all the repeated symbols are in a single Write Bar Code Control command. Parameters that always change or can change from symbol to symbol are in the Write Bar Code command. A separate Write Bar Code command must be used with the variable bar code data for each symbol.

Upon receiving the Write Bar Code Control command, the printer enters the appropriate bar code block state. The printer then initializes control for processing bar code symbols in subsequent Write Bar Code commands. Receiving the End Code in the bar code block state terminates the processing of bar code data.

The Write Bar Code Control command data contains three consecutive structured fields:

- Bar Code Area Position (BCAP)
- Bar Code Output Control (BCOC)
- Bar Code Data Descriptor (BCDD).

Each structured field contains a two byte length field, then a two byte structured field ID, and finally a data field.

Note: For more detailed information on bar codes, see Appendix C, "4247 Bar Code and OCR Printing Options," on page 323.

Bar Code Area Position (BCAP)

BCAP	BCOC	BCDD
------	------	------

Length	ID	Data
--------	----	------

The Bar Code Area Position Control structured field is the first structured field in the DATA portion of the Write Bar Code Control command. This field defines the origin and orientation of the bar code block relative to the reference coordinate system. The format of the BCAP field is:

Decimal	Hex	Content	Description
0-1	0-1	000B - XXXX	Length of This Field
2-3	2-3	AC6B	Structured Field ID

Decimal	Hex	Content	Description
4-5	4-5	8000 - 7FFF	X Coordinate of Origin of Bar Code Block
6-7	6-7	8000 - 7FFF	Y Coordinate of Origin of Bar Code Block
8-9	8-9	0000 2D00 Note (2) 5A00 8700	When you use the X,Y coordinate system or the I,B coordinate system with the inline orientation equal to 0 degrees, you must use the 0 or 90 degree orientation for bar codes. When you use the I,B reference system and the inline orientation is 180 degrees, you must use the 180 or 270 degree orientation for bar codes.
10	A	00 20 40 60 A0	Absolute I, Absolute B Absolute I, Relative B Relative I, Absolute B Relative I, Relative B Absolute X, Absolute Y
11-x	B-x		Reserved

Notes:

- Any positive or negative value fitting in the two byte field is allowable. Negative values are in two's-complement form. Figure 6-38 shows the BCAP field specifying the top left reference point, or origin, for the bar code block, relative to the logical page.
- Bar codes with a unit/module width of 0.533 mm (0.021 in.) cannot be printed in high speed mode. Bar codes with a unit/module width of 0.356 mm (0.014 in.) and a wide-to-narrow ratio of 2.5:1 cannot be printed in high speed mode.

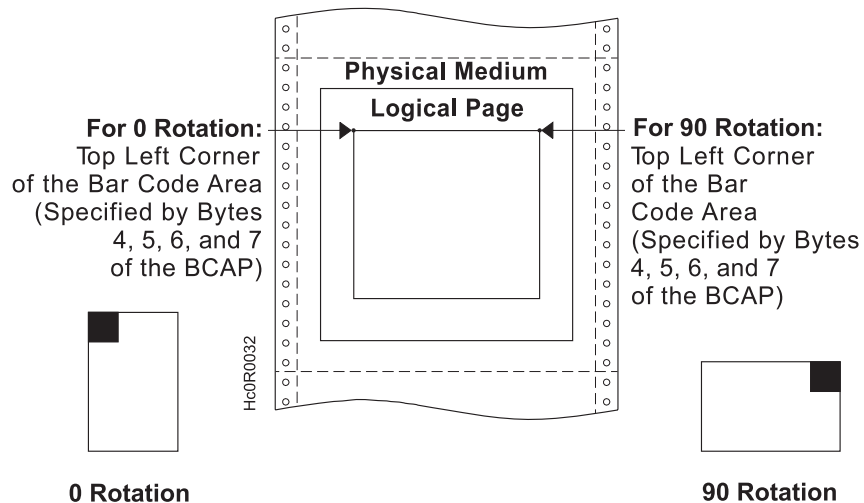


Figure 26. Specifying the Bar Code Block Using the Bar Code Area Position Field

Byte A of the BCAP specifies the reference coordinate system. The reference coordinate system for determining the top left corner of the bar code area can be either the X,Y or the I,B coordinate system.

If byte A equals X'00', the absolute I and B coordinates determine the top left corner. BCAP bytes 4 and 5 specify the text inline coordinate. BCAP bytes 6 and 7 specify the text baseline coordinate.

If byte A equals X'20', the absolute I and relative B coordinates determine the top left corner. BCAP bytes 4 and 5 specify the text inline coordinate. BCAP bytes 6 and 7 add to the last text baseline coordinate position prior to bar codes.

If byte A equals X'40', the relative I and absolute B coordinates determine the top left corner. BCAP bytes 4 and 5 add to the last text inline coordinate position prior to bar codes. BCAP bytes 6 and 7 specify the text baseline coordinate.

If byte A equals X'60', the relative I and B coordinates determine the top left corner. BCAP bytes 4 and 5 add to the last text inline coordinate position prior to bar codes. BCAP bytes 6 and 7 add to the last text baseline coordinate position prior to bar codes.

If byte A equals X'A0', the current logical page X and Y coordinates determine the origin. When the block is within a page, BCAP bytes 4-7 specify the offset from the X-coordinate and Y-coordinate origin specified in a previously received LPP command (or from the printer default coordinates if no LPP command received). When the block is within an overlay that is invoked using an LCC command, BCAP bytes 4-7 specify the offset from the X_m -coordinate and Y_m -coordinate origin. When the block is within an overlay that is invoked using an IO command, BCAP bytes 4-7 specify the offset from the X-coordinate and Y-coordinate origin specified in the IO command.

When you use the X,Y coordinate system or the I,B coordinate system with the inline orientation equal to 0 degrees, you must use the 0 or 90 degree orientation for bar codes.

When you use the I,B reference system and the inline orientation is 180 degrees, you must use the 180 or 270 degree orientation for bar codes.

Bar Code Output Control (BCOC)

BCAP	BCOC	BCDD
------	------	------

Length	ID	Data
--------	----	------

The Bar Code Output Control structured field is the second structured field in the DATA portion of the Write Bar Code Control command. This field specifies the mapping option for the bar code block. This field is optional and may not be present in the Write Bar Code Control command.

If the BCOC field is not present, the bar code block is equal to the bar code medium presentation space. The format of the BCOC field is:

Decimal	Hex	Content	Description
0-1	0-1	0010 - XXXX	Length of This Structured Field
2-3	2-3	A66B	Structured Field ID
4	4	00 01	Unit Base (10 in.) Unit Base (10 cm)
5-6	5-6	05A0 - 7FFF 1626 - 7FFF	Units per Unit Base (10 in.) Units per Unit Base (10 cm)
7-8	7-8	1 - 7FFF FFFF	Block Width (X-Extent of Block) Use LPD Value
9-10	9-A	1 - 7FFF FFFF	Block Height (Y-Extent of Block) Use LPD Value
11	B	30	Area Mapping Option - Position

Decimal	Hex	Content	Description
12-13	C-D	8000 - 7FFF	X Offset of Medium Presentation Space Origin in Units
14-15	E-F	8000 - 7FFF	Y Offset of Medium Presentation Space Origin in Units
16-x	10-x		Reserved

Figure 27 shows the BCOC field specifying the size of the bar code block on the logical page.

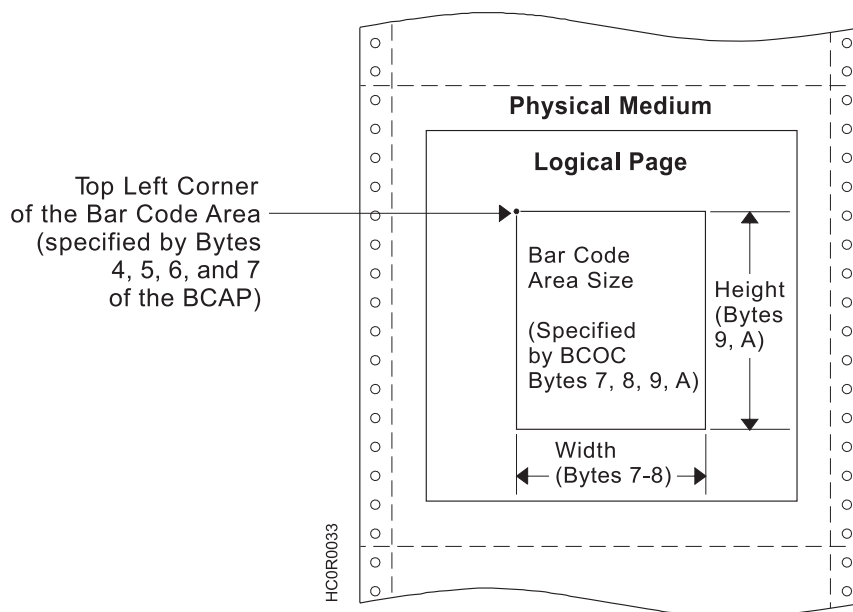


Figure 27. Specifying the Bar Code Block Size Using the Bar Code Output Control

Bar Code Data Descriptor (BCDD)

BCAP	BCOC	BCDD
------	------	------

Length	ID	Data
--------	----	------

The Bar Code Data Descriptor structured field is the last structured field in the DATA portion of the Write Bar Code Control command. This field specifies the parameters that define the bar code symbols that print. The format of the BCDD field is:

Decimal	Hex	Content	Description
0-1	0-1	001B - XXXX	Length of This Structured Field
2-3	2-3	A6EB	Structured Field ID
4	4	00 01	Unit Base (10 in.) Unit Base (10 cm)
5	5		Reserved
6-7	6-7	05A0 - 7FFF 1626 - 7FFF	Units per Unit Base (10 in.) Units per Unit Base (10 cm)
8-9	8-9	05A0 - 7FFF 1626 - 7FFF	Units per Unit Base (10 in.) Units per Unit Base (10 cm)

Decimal	Hex	Content	Description
10-11	A-B	1 - 7FFF FFFF	X-Extent of Medium Presentation Space (Width) Use BCOC bytes 7-8 if BCOC is present. Otherwise, use LPD value.
12-13	C-D	1 - 7FFF FFFF	Y-Extent of Medium Presentation Space (Height) Use BCOC bytes 9-A if BCOC is present. Otherwise, use LPD value.
14-15	E-F		Reserved
16	10	00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E-10 11 12-15 16 17 18	Bar Code Type Reserved 3 of 9 Code MSI UPC - Version A Reserved UPC - Version E UPC - Two Digit Add-On (Magazine) UPC - Five Digit Add-On (Paperback) EAN-8 EAN-13 2 of 5 Industrial 2 of 5 Matrix 2 of 5 Interleaved Codabar Reserved Code 128 Reserved EAN Two Digit Add On (Magazine) EAN Five Digit Add On (Paperback) POSTNET (See Note 6)
17	11		Modifier (See Note 1)
18	12	01-FE FF	Local Font ID (See Note 4) Printer Default
19-20	13-14	0000 0008 FF00 FF07 FF08 FFFF	Color support (See note 7) Printer Default (Black) Black Printer Default (Black) Color of Medium Printer Default (Black) Use Current Default

Decimal	Hex	Content	Description
21	15	0E 11 15 1C FF	Unit/Module Width (See Note 2) 0.36 mm (0.014 in.) Width 0.43 mm (0.017 in.) Width (Must have 0 in bytes 8-9 of BCAP) 0.53 mm (0.021 in.) Width 0.71 mm (0.028 in.) Width Printer Default
22-23	16-17	1 - 7FFF FFFF	Element Height (See Note 3) Printer Default
24	18	1 - FF	Height Multiplier (See Note 3)
25-26	19-1A	2, 14 19, 0FA 3, 1E FFFF	Wide-to-Narrow Ratio (See Note 5) 2:1 2.5:1 3:1 Printer Default
27-x	1B-x		Reserved

Notes:

1. The meaning of byte 11 (modifier byte) is dependent upon the bar code type. For the meaning of this byte, see "Modifier Byte" on page 188
2. Any bar code can print with a unit/module width of 0.36 mm (0.014 in.). The only bar codes that can print with a unit/module width of 0.53 and 0.71 mm (0.021 and 0.028 in.) are: Code 128, Codabar, Code 3 of 9, MSI, 2 of 5 Industrial, 2 of 5 Matrix, and 2 of 5 Interleaved. If an unsupported unit/module width is specified, the closest smaller supported unit/module width is used. For 0.43 mm (0.017 in.), bar code block must equal 0 in BCAP bytes 8 - 9.
3. For all bar code types except UPC and EAN, the specified height equals the height of the bar/space patterns. For UPC and EAN bar codes, the specified height includes the bar/space patterns and the HRI. If a UPC or EAN bar code specifies a height less than or equal to 190 units at 1440 units per in., the height of the bar/space patterns equals the specified height and the total height is the specified height plus the HRI height (180 units at 1440 units per in.).

If UPC supplemental or EAN add-on bar codes specify a zero degree rotation and a height less than or equal to 460 units at 1440 units per in., the top of the bar/space patterns begins at the symbol reference point. The height of the bar/space patterns equals the specified height, and the total height equals the specified height plus the HRI height (450 units at 1440 units per in.). Otherwise, the top of the HRI begins at the symbol reference point and the specified height includes the bar/space patterns and the HRI.

If UPC supplemental or EAN add-on bar codes specify a 90 degree rotation and a height less than or equal to 420 units at 1440 units per in., the top of the bar/space patterns begins at the symbol reference point. The height of the bar/space patterns equals the specified height, and the total height equals the specified height plus the HRI height (410 units at 1440 units per in.). Otherwise, the top of the HRI begins at the symbol reference point and the specified height includes the bar/space patterns and the HRI.

4. Byte 12 selects a Local Font ID, either OCR-A or OCR-B, for use when printing the Human Readable Information (HRI) beneath the bar code. The list below shows the bar code types that use OCR-A and those that use OCR-B:

OCR-A

Code 128
Code 3 of 9

OCR-B

UPC - Version A
UPC - Version E

OCR-A

MSI
 2 of 5 Industrial
 2 of 5 Matrix
 2 of 5 Interleaved
 Codabar

OCR-B

UPC - Two Digit Add-On (Magazine)
 UPC - Five Digit Add-On (Paperback)
 EAN-8
 EAN-13
 EAN Two Digit Add-On
 EAN Five Digit Add-On

5. Wide-to-Narrow ratio is only valid for the following bar code types:

- Code 3 of 9 (X'01')
- MSI (X'02')
- 2 of 5 Industrial (X'0A')
- 2 of 5 Matrix (X'0B')
- Interleaved 2 of 5 (X'0C')
- Codabar (X'0D')

The default ratio for Codabar, Code 3 of 9, and the 2 of 5 types is 2.5:1 for unit/module width of 0.36 and 0.43 mm (0.014 and 0.017 in.), 3:1 for 0.53 mm (0.021 in.), and 2.5:1 for 0.71 mm (0.028 in.) The default for MSI is always 2:1.

6. BCDD bytes 12 and 15-1A and WBC command byte 0 are not applicable to POSTNET; these bytes are ignored by the printer as the POSTNET Specification defines values for these parameters.
7. The 4247 Printer provides Limited Simulated Color Support. All architecturally defined color values for graphics data are accepted and result in simulation of the specified colors without generation of unsupported color exceptions. All valid colors not listed in the above table (X'0001' through X'0007', X'0009' through X'0010', and X'FF01' through X'FF06') are simulated by printing in black.
8. If the color requested is not available, the printer uses black.

Figure 28 on page 188 shows the BCDD field specifying the size of the bar code medium presentation space within the bar code block on the logical page. The bar code medium presentation space must fit within the bar code block.

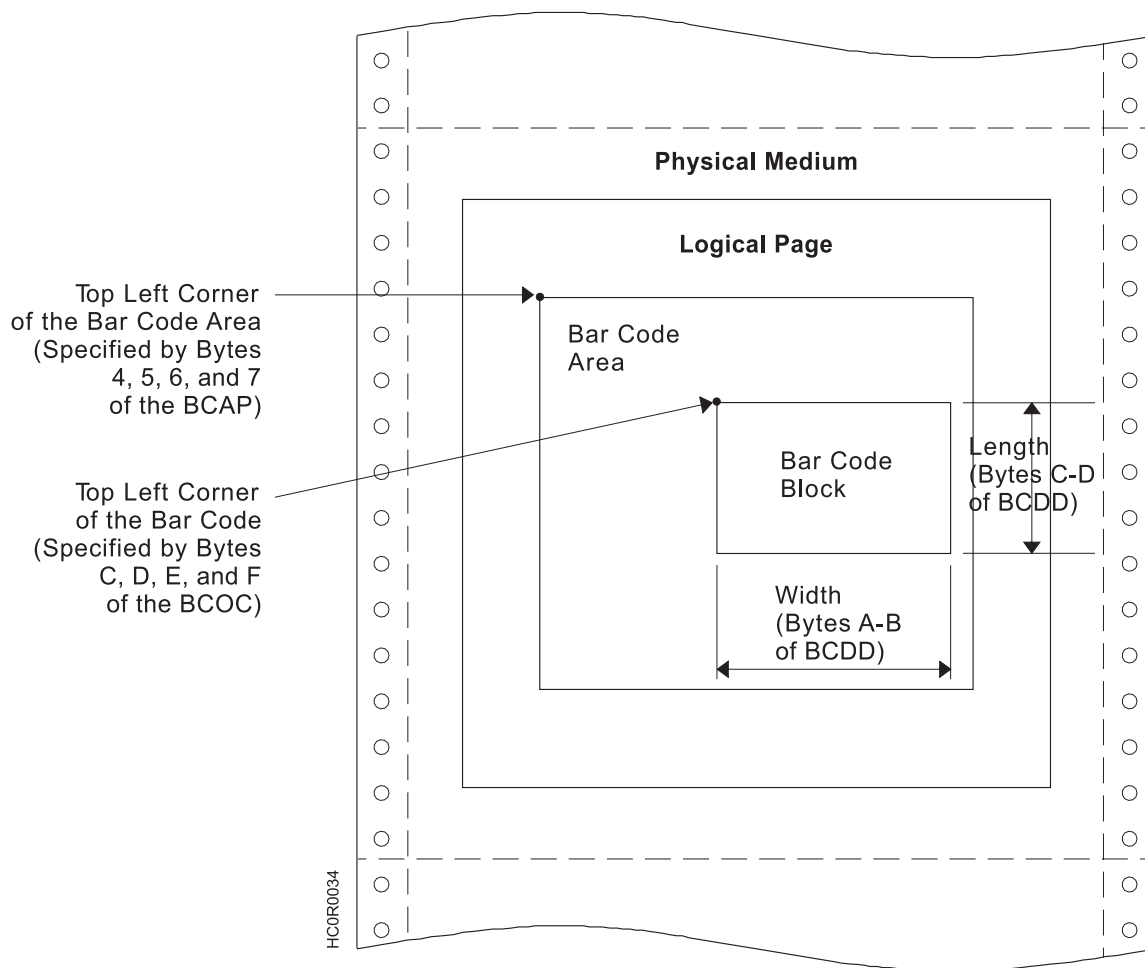


Figure 28. Specifying the Bar Code Medium Presentation Space Size. Using the Bar Code Data Descriptor

Modifier Byte: 3 of 9 Code:

- 01 Print bar code with no printer generated check character.
- 02 Generate check character and print with bar code.

MSI Code:

- 01 Print bar code with no printer generated check character.
- 02 Print bar code with IBM Modulus 10 check digit generated by the printer and put at the end of the data. This check digit will be the second check digit.
- 03 Print bar code with both check digits generated by the printer and put at the end of the data. The second check digit will be IBM Modulus 10. The first check digit will also be IBM Modulus 10.
- 04 Print bar code with both check digits generated by the printer and put at the end of the data. The second check digit will be IBM Modulus 10. The first check digit will be NCR Modulus 11. Check digit equals remainder; check digit of 10 equals error.
- 05 Print bar code with both check digits generated by the printer and put at the end of the data. The second check digit will be IBM Modulus 10. The first check digit will be IBM Modulus 11. Check digit equals remainder; check digit of 10 equals error.
- 06 Print bar code with both check digits generated by the printer and put at the end of the data. The second check digit will be IBM Modulus 10. The first check digit will be NCR Modulus 11. Check digit equals 11 minus remainder; check digit of 10 equals zero.

- 07 Print bar code with both check digits generated by the printer and put at the end of the data. The second check digit will be IBM Modulus 10. The first check digit will be IBM Modulus 11. Check digit equals 11 minus remainder; check digit of 10 equals zero.
- 08 Print bar code with both check digits generated by the printer and put at the end of the data. The second check digit will be IBM Modulus 10. The first check digit will be NCR Modulus 11. Check digit equals 11 minus remainder; check digit of 10 equals error.
- 09 Print bar code with both check digits generated by the printer and put at the end of the data. The second check digit will be IBM Modulus 10. The first check digit will be IBM Modulus 11. Check digit equals 11 minus remainder; check digit of 10 equals error.

UPC Version A:

- 00 Generate check digit and print standard symbol. Variable data field of Write Bar Code command contains 11 bytes, first the number system digit, then the 10 article number digits.

UPC Version E:

- 00 Print bar code; six digits are bar encoded. Ten variable data characters are input. From the ten input digits, the printer generates both the check digit and the six bar code characters. The printer does not bar code the check digit. The check digit only assigns odd or even parity to the six bar encoded digits.

UPC Two Digit Add-On:

- 00 Print the two supplemental digits (bar/space pattern and HRI). The Write Bar Code command variable data consists only of the two supplemental digits. The preceding Version A or E symbol prints under control of separate Write Bar Code Control and Write Bar Code commands.

UPC Five Digit Add-On:

- 00 Print the five supplemental digits (bar/space pattern and HRI). The Write Bar Code command variable data consists only of the supplemental digits. The preceding Version A or E symbol prints under control of separate Write Bar Code Control and Write Bar Code commands.

EAN-8:

- 00 Print the bar code symbol. The input variable data is seven digits: two flag digits and five article identification digits. The seven digits are all bar coded along with a check digit generated by the printer. The check digit follows the last article identification digit.

EAN-13:

- 00 Print the bar code symbol. The input variable data is twelve digits — two flag digits and ten article identification digits, in that order. The first flag digit is not bar encoded. The second flag digit, the article identification digits, and a check digit generated by the printer are bar encoded. The first flag digit prints in human readable form at the bottom of the left quiet zone. The first flag digit governs the A/B number set pattern of the bar/space encoding of the six digits to the left of the center pattern.

Two of Five Industrial, Two of Five Matrix, Two of Five Interleaved:

- 01 Print the bar code with no printer generated check digit.
- 02 Generate the check digit and print it with the bar code.

EAN Two Digit Add-On:

- 00 Print the two add-on digits (bar/space pattern and HRI). The Write Bar Code command variable

data consists of only the add-on digits. The preceding EAN-13 symbol prints under control of separate Write Bar Code Control and Write Bar Code commands.

EAN Five Digit Add-On:

- 00 Print the five add-on digits (bar/space pattern and HRI). The Write Bar Code command variable data consists of only the add-on digits. The preceding EAN-13 symbol prints under control of separate Write Bar Code Control and Write Bar Code commands.

Codabar:

- 01 Print the bar code with no printer generated check digit.
- 02 Generate the check digit and print it with the bar code.

Code 128:

- 01 Print the bar code with no printer generated check digit (4230 and 4224 emulation only)
- 02 Generate the check digit and print it with the bar code.

Note: Code 128 is normally printed with a check digit.

POSTNET:

- 00 Print a U.S. Postal Service POSTNET ZIP Code (5 digit) bar code symbol. The ZIP Code to be bar encoded is defined as a 5-digit, numeric (0-9), input data variable to the Write Bar Code (WBC) command. The POSTNET ZIP Code bar code is printed with a leading frame bar, the bar encoded ZIP Code data, a correction digit, and a trailing frame bar.
- 01 Print a U.S. Postal Service POSTNET ZIP+4 (9 digit) bar code symbol. The ZIP+4 code to be bar encoded is defined as a 9-digit, numeric (0-9), input data variable to the Write Bar Code (WBC) command. The POSTNET ZIP+4 bar code is printed with a leading frame bar, the bar encoded ZIP+4 Code data, a correction digit, and a trailing frame bar.
- 02 Print a U.S. Postal Service POSTNET Advanced Bar Code (ABC, 11 digit) bar code symbol. The ABC code to be bar encoded is defined as an 11-digit, numeric (0-9), input data variable to the Write Bar Code (WBC) command. The POSTNET ABC bar code is printed with a leading frame bar, the bar encoded ABC data, a correction digit, and a trailing frame bar.
- 03 Print a variable length POSTNET bar code symbol. The code to be bar encoded is defined as a n-digit, numeric (0-9), input data variable to the Write Bar Code (WBC) command. The printer produces a bar code symbol without length checking; the symbol is not guaranteed to be scannable or interpretable. The POSTNET variable-length bar code is printed with a leading frame bar, the bar encoded data, a correction digit, and a trailing frame bar.

Write Bar Code (WBC)

Length	D681	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

The Write Bar Code command transmits data (code points) to output as a bar code symbol. This command contains parameters that locate the symbol reference point within the bar code medium presentation space. The WBC command also contains the variable bar code data for printing as bar/space patterns and information about printing the code in human readable form.

A flag byte contains information as to whether a human readable interpretation (HRI) is to print, whether the HRI is to be above or below the bar/space patterns, and for the 3 of 9 code, whether the HRI of the start/stop character (a star or asterisk) is to print or not.

The HRI code prints in the OCR-A or the OCR-B font, depending on the bar code type. The following bar codes print the HRI in OCR-A:

- Code 128
- Code 3 of 9
- MSI
- 2 of 5 Industrial
- 2 of 5 Matrix
- 2 of 5 Interleaved
- Codabar.

The following bar codes print the HRI in OCR-B:

- UPC-A
- UPC-E
- UPC Two Digit Add-On
- UPC Five Digit Add-On
- EAN-8
- EAN-13
- EAN Two Digit Add-On
- EAN Five Digit Add-On.

POSTNET bar codes have no HRI.

The DATA field for the WBC command has the following format:

Decimal	Hex	Content	Description
0	0	Bit 0 Bit 1-2 Bit 3 Bit 4-7	Flags 0 - Print Human Readable Code (HRI) 1 - Do Not Print HRI 00 - Printer Option 01 - Print HRI Below Symbol - Valid for Code 128, Codabar, 3 of 9, MSI, UPC-A, UPC-E, EAN-8, EAN-13, and All 2 of 5 Bar Codes. 10 - Print HRI Above Symbol - Not valid for UPC and EAN without 2-Digit Supplemental and UPC and EAN 5-Digit Supplemental. 11 - Invalid Combination 0 - Do Not Print Asterisk (*) with Bar Code 3 of 9 1 - Print Asterisk (*) with Bar Code 3 of 9 Reserved
1-2	1-2	1 - 7FFF	X Coordinate of Symbol Reference Point
3-4	3-4	1 - 7FFF	Y Coordinate of Symbol Reference Point
5- <i>n</i>	5- <i>n</i>		Bar Code Data (See Note 3)

Decimal	Hex	Content	Description
<p>Notes: If bar codes with human readable interpretation (HRI) are placed too close to the page edges, the human readable characters may fall outside the physical medium boundaries. If the HRI falls outside the physical medium boundaries, the characters may not print and a Position Check error, X'041100', may occur.</p> <p>To ensure that the human-readable characters print, choose X and Y parameter values that allow sufficient space for the characters to print. Some guidelines are:</p> <ol style="list-style-type: none"> 1. For bar code types UPC-A, UPC-E, EAN-8, and EAN-13, choose X and Y coordinates that place the bar code at least 3.88 mm (0.15 in.) from both the top and left edges of the page. 2. For bar code types UPC Two Digit Add-On and UPC Five Digit Add-On, choose a Y coordinate that places the bar code at least 6.35 mm (0.25 in.) from the top edge of the page. 3. For Codabar bar codes, the data must include the START and STOP characters. For Code 128 bar codes, the table on the following page should be used to determine the hex value of the desired character. <p>The symbol reference point must be inside the bar code medium presentation space and must lie within the logical page.</p>			

Code 128 Character Set (EBCDIC)

Table 7. Code 128 Character Set (EBCDIC)

Character	Hex	Character	Hex	Character	Hex	Character	Hex
NUL	00	.	4B	i	89	I	C9
SOH	01	<	4C	FNC 1	8F	}	D0
STX	02	(	4D	j	91	J	D1
ETX	03	+	4E	k	92	K	D2
HT	05	|	4F	l	93	L	D3
VT	0B	&	50	m	94	M	D4
FF	0C	!	5A	n	95	N	D5
CR	0D	\$	5B	o	96	O	D6
SO	0E	*	5C	p	97	P	D7
SI	0F	)	5D	q	98	Q	D8
DLE	10	;	5E	r	91	R	D9
DC1	11	_	60	~	A1	\	E0
DC2	12	/	61	s	A2	S	E2
DC3	13	,	6B	t	A3	T	E3
BS	16	%	6C	u	A4	U	E4
CAN	18	-	6D	v	A5	V	E5
EM	19	>	6E	w	A6	W	E6
GS	1D	?	6F	x	A7	X	E7
RS	1E	'	79	y	A8	Y	E8
US	1F	:	7A	z	A9	Z	E9
FS	22	#	7B	^	BO	FNC 2	EA
LF	25	@	7C	[	BA	0	F0
ETB	26	'	7D	]	BB	1	F1
ESC	27	=	7E	FNC 4	BE	2	F2

Table 7. Code 128 Character Set (EBCDIC) (continued)

Character	Hex	Character	Hex	Character	Hex	Character	Hex
ENQ	2D	"	7F	{	C0	3	F3
ACK	2E	a	81	A	C1	4	F4
BEL	2F	b	82	B	C2	5	F5
SYN	32	c	83	C	C3	6	F6
EOT	37	d	84	D	C4	7	F7
DC4	3C	e	85	E	C5	8	F8
NAK	3D	f	86	F	C6	9	F9
SUB	3F	g	87	G	C7	FNC3	FA
SP	40	h	88	H	C8	DEL	FF

Note: All START, STOP, SHIFT, and CODE characters are generated by the printer in order to produce the shortest bar code possible from the given data.

Overlay Function Set Commands

The overlay function set contains the commands the printer uses to store, delete, and present information in the overlay memory of the printer. These commands are independent of any specific data types used in defining the overlay.

The overlay is contained between the Begin Overlay (BO) command and the End Page (EP) command and cannot contain itself. Overlays can be nested; that is, overlays can contain other overlays. The depth of the overlay nesting cannot exceed five levels.

Figure 29 shows an overlay nesting.

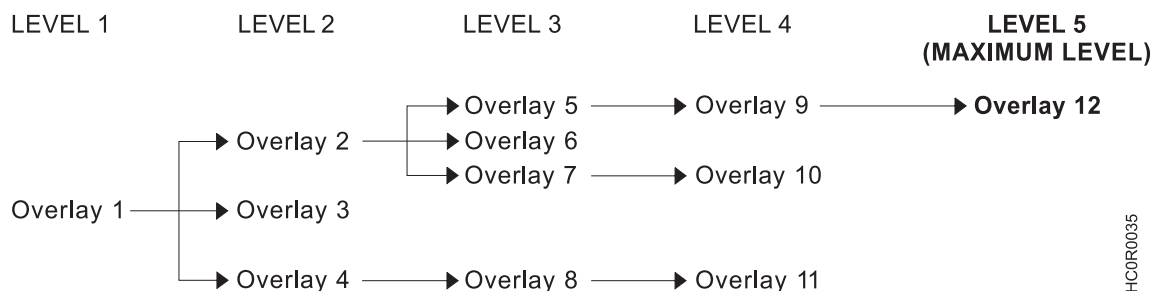


Figure 29. An Example of Overlay Nesting

The following commands are the overlay function set:

Command	Code	Description
BO	D6DF	Begin Overlay
DO	D6EF	Delete Overlay
IO	D67D	Include Overlay

The following pages describe the overlay function set commands.

Begin Overlay (BO)

Length	D6DF	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

The Begin Overlay command causes the printer to leave the home state and enter the overlay state. This command defines data that the printer saves for later use within an overlay. The printer later merges the stored overlay with ordinary printed pages by using the Include Overlay command or the Load Copy Control command. The current Load Page Description, Load Font Equivalence, and Load Equivalence records, if any, become part of the definition of the overlay. The definition of the overlay terminates by an End Page command. The overlay itself is between the Begin Overlay and the End Page commands.

The DATA field is one byte and it specifies the overlay ID. Valid values for this byte are decimal 1 through 254 (X'1' through X'FE'). If this value specifies an overlay identifier already loaded in the printer, an exception occurs.

Note: Because overlays use more than the normal amount of printer storage, use overlays only when data needs to be kept.

Delete Overlay (DO)

Length	D6EF	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

The Delete Overlay command deletes (clears) either a single overlay or all overlays from the printer memory.

The DATA field is one byte in length and can be any value between 0 and 254 (X'00' to X'FE'). This value is the overlay identifier, and it specifies the overlay to be deleted. If this value is zero, all overlays are deleted.

Include Overlay (IO)

Length	D67D	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

The Include Overlay command causes a previously stored overlay to merge onto the current page at the specified presentation position. Following the inclusion and processing of an overlay, the current print position remains where it was prior to the overlay processing. The printer restores all page description values, font and suppression equivalences, and text control values to the values that existed for each at the time the overlay was processed.

The DATA field is 10 bytes in length, and contains the following:

Decimal	Hex	Content	Description
0-1	0-1	0001 - 00FE	Overlay ID
2	00	Reserved	
3-5	3-5	000000 - 007FFF FF8000 - FFFFFE FFFFFF	X Coordinate Positive Offset Value Relative to the Logical Page Negative Offset Value Relative to the Logical Page Use the Current Inline Text Position
6	6	00	Reserved

Decimal	Hex	Content	Description
7-9	7-9	000000 - 007FFF	Y Coordinate Positive Offset Value Relative to the Logical Page
		FF8000 - FFFFFE	Negative Offset Value Relative to the Logical Page
		FFFFFF	Use the Current Baseline Text Position

Note: Negative values must be specified in twos-complement form.

Page Segment Function Set Commands

The page segment function set contains the commands the printer uses to store, delete, and present information in the page segment memory of the printer. These commands are independent of any specific data types defining the page segment. The following commands are the page segment function set:

Command	Code	Description
BPS	D65F	Begin Page Segment
DPS	D66F	Deactivate Page Segment
IPS	D67F	Include Page Segment

The following pages describe the page segment function set commands.

Begin Page Segment (BPS)

Length	D65F	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

The Begin Page Segment command causes the printer to enter the page segment state. This command is only valid in the home state. Receipt of an End Page command while in the page segment state causes the printer to return to the home state.

The Page Segment command defines a segment of page data to save within the printer for later printing. This printer later includes this segment when it receives the Include Page Segment command.

The DATA field is two bytes in length and can be any value between X'01' and X'7F'. This value is the page segment identifier. If this value specifies a page segment identifier already loaded in the printer, an exception occurs.

Note: Because page segments use more than the normal amount of printer storage, use page segments only when data needs to be kept.

Include Page Segment (IPS)

Length	D67F	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

The Include Page Segment command causes a previously stored set of commands to process in the input data stream as though they were just received from the host. The printer places the segment at the current presentation position and updates the presentation position as a result of this command.

The DATA field is two bytes in length and can be any value between X'01' and X'7F'. This value is the page segment identifier, and it specifies the page segment to include. A value specifying a page segment identifier that is not defined in the printer causes an exception to occur.

Deactivate Page Segment (DPS)

Length	D66F	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

The Deactivate Page Segment command deletes (clears) either a single page segment or all page segments from the printer memory.

The DATA field is two bytes in length and can be any value between X'00' and X'7F'. This value is the page segment identifier, and it specifies the page segment to delete. A value of zero deletes all segments.

Loaded Font Function Set Commands

The loaded font function set contains the commands the printer uses to download and delete font information from the font storage of the printer. The following commands are the loaded font function set:

Command	Code	Description
LSS	D61E	Load Symbol Set

The following pages describe the loaded font function set commands.

Load Symbol Set (LSS)

Length	D61E	Flag	Correlation ID (Optional)	DATA
--------	------	------	---------------------------	------

The Load Symbol Set command provides control and pattern information for code points of a font. This command is only valid in the home state and does not result in a state transition. The DATA field contains the following information:

Decimal	Hex	Content	Description
0	0	90	FLAGS (Vertical Format Download - See Note 1)
1	1	00	Reserved
2	2	01-0F	Starting Code Point
3	3	00	Reserved
4	4	0D-FF	Additional Parameter Byte Length (This Value Is One More Than the Number of Bytes Remaining)
5	5	60	No Self-Defining Fields Present
		61	Self-Defining Fields Present
6	6	XX	Uniform Character Box Size X Dimension (See Note 2)
7	7		Uniform Character Box Size Y Dimension
			DP and DP Text Quality
		09	NLQ
		12	
8	8	00	Reserved
9	9	00	Reserved

Decimal	Hex	Content	Description
10	A	00	Reserved
11	B	01-FF	Ending Code Point
12	C	00	Reserved
13	D	00	Reserved
14	E	00	Reserved
15-16	F-10	0001 - 7EFF	Loaded Font Identifier (See Note 3)
17-x	11-x	00...00	Reserved (See Note 4)
(x+1) - xx	(x+1) - xx	02FF...XX	Self-Defining Fields
o-p	o-p	XX...XX	Character Raster Data

Notes:

1. Vertical format download refers to the method used to send the character patterns to the printer. The bits are organized as a sequence of vertical cell slices. Each slice contains a number of bits equal to the uniform box Y size (byte 7). Slices are contiguous (run together) in the raster pattern data. The last slice of each character is padded with the minimum number of bits needed to reach a byte boundary. Padded bits are always zeros. The number of vertical slices per character is equal to the uniform box X size (byte 6).
The first vertical slice received by the printer is the left reference edge of the character box. The last slice received is the right reference edge of the character box. The first received pel of each slice makes up the top reference edge of each character box. The last received non-padding pel of each slice makes up the bottom reference edge of each character box.
2. The meaning of this byte depends upon the font selected, as explained below.
3. An LFE entry must exist for this LFID prior to receiving the LSS command; otherwise an error occurs.
4. The value of byte 4 determines the number of bytes in this field.
5. Load symbol set into Fast Draft fonts is not allowed.

Character Box Size X Dimension (Byte 6): The meaning of byte 6 is as follows:

- Resident Fonts, except PSM
 - 0A - DP Quality
 - 14 - DP Text and NLQ Quality
- Resident PSM Fonts
 - 01-FF - DP Text Quality
 - 01-FF - NLQ Quality
- Non-Resident Fonts
 - 01-FF - With Y Dimension (byte 7) equal to 09
 - 01-FF - With Y Dimension (byte 7) equal to 12.

The print quality must be set appropriately (with the PQC command) before the LSS command is issued if the font is present in the printer (specified by the LFE command).

Self-Defining Fields: If byte 5, bit 7, equals one, then the DATA field includes one or more self-defining fields. The format of each field is:

L	T	Data
---	---	------

L and T are single byte values that specify the length and type of self-defining field. The only valid self-defining field is the terminator field X'02FF', without any data. The character raster patterns immediately follow this field. The printer ignores any other self-defining fields.

Character Raster Patterns: Data in this field contains the actual code points (bit patterns) for the font specified in bytes 0F and 10. If the font identifier matches an existing font ID, and one or more of the code points specified in bytes 2 and 0B overlap previously specified code points, then the printer replaces the character patterns of the previously specified code points, regardless of how they were originally loaded.

Note: We recommend that image data bits for the last vertical column of NLQ character patterns be all zeros. The printer clips the graphics representation of the last vertical column if NLQ characters are expanded for graphics printing (see “Set Character Cell Size” on page 166). Resident NLQ text character patterns do not contain image data (dots) in the last column of the character box.

Chapter 5. IPDS Exception Reporting Codes

The following tables contain the exception reporting codes, which the printer sends to the host in the NACK reply. These codes are in a three-byte format. The first byte, byte 0, is the error group. The remaining two bytes, bytes 1 and 2, are the individual error identifiers. Table 8 shows the error group meanings:

Table 8. Exception Reporting Group Codes

Byte 0	Error Type
80	"Command Reject - X'80"
40	"Intervention Required - X'40"
10	"Equipment Check - X'10" on page 200
08	"Data Check - X'08" on page 200
04	"Specification Check-Bar Code - X'04" on page 200
03	"Specification Check-Graphics - X'03" on page 202
02	"Specification Check-General - X'02" on page 204
01	"Conditions Requiring Host Notification - X'01" on page 213

Command Reject: Indicates that the printer cannot recognize a received command.

Intervention Required: Indicates that the printer requires operator intervention.

Equipment Check: Indicates that a hardware error has occurred. **Data Check:** Indicates that the printer detects a data error when receiving a logical unit from the application program or that the printer detects a data error while printing the page.

Specification Check: Indicates that the data parameters or values in a received command are invalid.

Condition Requiring Host Notification: Indicates that the printer has detected an error or condition that should be reported to the host computer.

Command Reject - X'80'

The following exception codes are the valid codes for a command reject condition:

X'800100' Invalid IPDS Command Code

Explanation:

1. The command code is not recognized. A error length on a previous command may have caused the current data to be processed as a command.
2. The command is not supported.

Alternate Exception Action: None

X'800200' Invalid IPDS Command Sequence

Explanation: The printer state is invalid for the received command.

Alternate Exception Action: None

Intervention Required - X'40'

The following exception codes are the valid codes for an intervention required condition:

X'400000' Printer Not Ready

Explanation: The printer needs operator intervention to tear off a continuous forms paper source so paper

source switching can be done when in 4224 emulation mode.

Alternate Exception Action: None.

X'400100' Printer Out of Forms

Alternate Exception Action: None.

X'401300' Tear-Off Required

Explanation: The printer needs operator intervention to tear off a continuous forms paper source so paper source switching can be done.

Alternate Exception Action: None.

X'402000' Incorrect Forms Module Selection

Alternate Exception Action: None.

X'40E000' Forms Jam

Alternate Exception Action: None.

X'40E400' Cancel Print Key Pressed

Explanation: The Cancel Print key was pressed while the printer was receiving IPDS data.

Alternate Exception Action: None.

Equipment Check - X'10'

The following exception codes are the valid codes for an equipment check condition:

X'10F100' Permanent Error

Explanation:

1. There was a permanent hardware error.
2. The microcode detected an irrecoverable logic error.

3. The microcode detected a condition that should not have occurred.

Alternate Exception Action: None.

Data Check - X'08'

The following exception codes are the valid codes for a data check condition:

X'082100' Undefined Character

Explanation:

1. An undefined character code has been detected in Write Text data.
2. An undefined overstrike character code has been detected.
3. A character has been detected in Write Text Command data which is undefined at the quality level specified by the XOA-PQC command.
4. An undefined character code has been detected in Write Bar Code data.

Alternate Exception Action: For reasons 1-3, print the default character. For reason 4, there is no alternate exception action.

X'08C100' Position Check

Explanation: An attempt was made to print outside the valid printable area.

Alternate Exception Action: All physical printing outside the valid printable area is suppressed. All data and controls continue processing. The printer continues to print within the valid printable area to the greatest possible extent. For text, this may mean truncating text lines at the character boundary closest to the edge of the intersection. For graphics, this may mean truncating graphics pictures at the pel closest to the boundary. For image, this may mean truncating scan lines at the pel closest to the boundary, or alternatively, not printing any of the image if any part of the image falls outside the valid printable area.

Specification Check-Bar Code - X'04'

The following exception codes are the valid codes for a bar code specification check condition:

X'040300' Bar Code Type Requested Is Not Supported

Explanation: The bar code type requested in the Write Bar Code Data Descriptor field is not supported.

Alternate Exception Action: None.

Alternate Exception Action: Use printer default.

X'040500' Bar Code Color Requested Is Not Supported

Explanation: The color requested in the Write Bar Code Data Descriptor field is not supported.

Alternate Exception Action: Use printer default color.

X'040400' LCID Requested Is Not Supported

Explanation: The type style/font requested in the Write Bar Code Data Descriptor field is not supported.

X'040600' Bar Code Color Requested Is Not Supported

Explanation: The unit/module width specified in the Write Bar Code Data Descriptor field is not supported.

Alternate Exception Action: Use closest smaller width supported or the device default for those devices with only one fixed default value.

X'040700' Element Height Specified Is Not Supported

Explanation: The element height specified in the Write Bar Code Data Descriptor field is not supported.

Alternate Exception Action: Use closest height supported.

X'040800' Height Multiplier Specified Is Not Supported

Explanation: The height multiplier specified in the Write Bar Code Data Descriptor field is not supported.

Alternate Exception Action: Use closest multiplier supported.

X'040900' Wide/Narrow Ratio Is Not Supported

Explanation: The wide/narrow ratio specified in the Write Bar Code Data Descriptor field is not supported.

Alternate Exception Action: Use the printer default wide element width. The default wide element width and the specified or default unit/module width should be such that a wide/narrow ratio of 2.50 or 3.00 results.

X'040A00' Invalid Symbol Reference Point

Explanation: The symbol reference point given in the Write Bar Code command is not a valid or supported value.

Alternate Exception Action: None.

X'040B00' Invalid Bar Code Modifier

Explanation: The bar code modifier, byte 17 of the Bar Code Data Descriptor structured field, is not a valid or supported value for the bar code type specified by byte 16 of the same structured field.

Alternate Exception Action: None.

X'040C00' Invalid Bar Code Data Length

Explanation: The length of the variable data (as given in bytes 5-n of the Write Bar Code command) to be bar-encoded/printed, plus any printer-generated check digits to be coded/printed, is not a valid or supported value.

Alternate Exception Action: None.

X'040E00' Check Digit Calculation Error

Explanation: A first check digit calculation resulting in a value of 10 is defined as an error in various of the modifier options (byte 17 of the Bar Code Data Descriptor structured field) for the MSI bar code.

Alternate Exception Action: None.

X'041000' HRI Location Not Supported

Explanation: HRI location specified in the FLAGS byte of the WBC command is not a supported location.

Alternate Exception Action: None.

X'041100' Attempt to Print Portion of Symbol Outside Block or VPA

Explanation:

1. A portion of the bar code presentation space, as mapped into the block, extends outside the bar code block boundaries, or a portion of the bar code block extends outside of the logical page (or current overlay).
2. An attempt is made to print a bar code symbol or HRI outside the physical page.
3. The symbol reference point lies outside the bar code block, presentation space, or logical page (or current overlay).

Alternate Exception Action: None.

Specification Check-Graphics - X'03'

The following exception codes are the valid codes for a graphics specification check condition:

X'030001' Unallocated Graphic Order or Command Code

Explanation:

1. An attempt was made to execute an unallocated order code that is reserved for future use.
2. An attempt was made to execute an unallocated command code that is reserved for future use.

Alternate Exception Action: None.

X'030002' Reserved Byte Error or Invalid Default

Explanation:

1. A reserved byte in the graphic order is not set to zero.
2. The Set Current Defaults instruction attempts, in byte 2, to set an invalid or unsupported attribute.
3. An invalid default byte value was received in the GDD.

Alternate Exception Action: None.

X'030003' Incorrect Drawing Order Length

Explanation: A drawing order length is invalid.

Alternate Exception Action: None.

X'030004' Invalid Attribute Value

Explanation: An attribute value for a graphic order or for a WGC Set Current Default instruction is invalid.

Alternate Exception Action: Use the standard default value for that attribute.

X'030008' Truncated Order Error

Explanation: An order has been requested that is not a complete order. This order is one of the following:

1. A fixed 2-byte order and the second byte is not in the segment.
2. A long order and the length byte is not in the segment.
3. A long order and the number of bytes following the byte containing the length count to the end of the segment is less than the value of the length count.

Alternate Exception Action: None.

X'03000C' Segment Prologue Error

Explanation: A supported order that is not valid within a prologue was found in a prologue.

The end of a segment was reached without an End Prologue order.

Alternate Exception Action: None.

X'03000E' Unsupported Attribute Value

Explanation: An attribute value for a graphic order or for a WGC Set Current Default instruction is not supported.

Alternate Exception Action: Use the standard default value for that attribute.

X'0300021' Invalid Default

Explanation: The Set Current Defaults instruction sets an invalid or unsupported default for an attribute.

Alternate Exception Action: None.

X'033400' Character Angle Value Not Supported

Explanation: The specific character angle requested is not supported.

Alternate Exception Action: Use the closest angle supported by the printer.

X'033E00' Invalid End Prologue

Explanation: An End Prologue was found outside the prologue section of a segment.

Alternate Exception Action: None.

X'036000' Area Bracket Error

Explanation: An End Area order has been executed without a Begin Area order having previously been executed.

Alternate Exception Action: None.

X'038000' Begin Area Received Incorrectly

Explanation: Begin Area order received while Begin Area is already in progress.

Alternate Exception Action: None.

X'036801' Area Truncation Error

Explanation: A Begin Area order has been executed in a segment, and the end of the segment is reached without an End Area order being executed. Area fill implementation results are printer dependent.

Alternate Exception Action: None.

X'036802' Supported Order Invalid in Area

Explanation: A supported order is detected that is not valid within an area.

Alternate Exception Action: None.

X'036803' Pattern Symbol Set Not Available

Explanation: The symbol set identified by the current Pattern Set is not available.

Alternate Exception Action: Use the standard default pattern symbol set.

X'036804' Undefined Pattern Symbol

Explanation: The current pattern symbol is undefined in the pattern symbol set.

Alternate Exception Action: Use the standard default pattern symbol.

X'037001' Invalid Repeat/Append Bit

Explanation: The Begin Segment Repeat/Append bit has a value of B'10' in chained immediate mode.

Alternate Exception Action: None.

X'037082' Invalid Repeat/Append Bit

Explanation: The Begin Segment Repeat/Append bit has a value of B'01'.

Alternate Exception Action: None.

X'0370C1' Invalid Begin Segment length

Explanation: The Begin Segment parameter length is invalid.

Alternate Exception Action: None.

X'039200' Graphic Image Order Sequence Error

Explanation: A Begin Image order was not executed before the Image Data order in this segment.

Alternate Exception Action: None.

X'039201' Image Data Discrepancy

Explanation: There are insufficient or too many bytes of data in the Image Data order.

Alternate Exception Action: None.

X'039300' Graphic Image Bracket Error

Explanation: An End Image order is executed without a Begin Image order having been previously executed.

Alternate Exception Action: None.

X'039301' Incorrect Number of Image Data Orders

Explanation: The number of Image Data orders between the Begin Image and End Image orders is not equal to the number of rows in the image (as given by the value of height in the Begin Image order).

Alternate Exception Action: None.

X'03C200' Marker Symbol Set Not Available

Explanation: The symbol set identified by the current Marker Set attribute is not available.

Alternate Exception Action: Use the standard default marker symbol set.

X'03C201' Undefined Marker Code

Explanation: A marker code point is undefined in the current marker symbol set.

Alternate Exception Action: Use the standard default marker symbol.

X'03C300' Character Symbol Set Not Available

Explanation:

1. The symbol set identified by the current Character Set is not available.
2. The current character set specified in the Set Character Set order does not have the proper attributes to be printed in graphics mode.

Alternate Exception Action: Use the standard default character symbol set.

X'03C301' Undefined Graphics Character Code

Explanation: A code in a character string is undefined in the current character symbol set.

Alternate Exception Action: Use the standard default character symbol.

X'03D100' Truncated Graphic Image Error

Explanation: A Begin Image order has been executed in a segment, and the end of the segment is reached without an End Image order having been executed.

Alternate Exception Action: None.

X'03D101' Invalid Order in Graphic Image

Explanation: A Begin Image order has been executed in a segment, and an order other than a Comment, Image Data, or End Image order is executed.

Alternate Exception Action: None.

X'03D102' Graphic Image Format Not Supported

Explanation: The value specified for the graphic image format parameter is not supported.

Alternate Exception Action: None.

X'03D103' Image Width Greater Than Maximum Supported

Explanation: The Width value specified in the Begin Image order exceeds the maximum image width supported by the product.

Alternate Exception Action: The image width is truncated at the maximum width supported.

X'03D104' Image Height Greater Than Maximum Supported

Explanation: The Height value specified in the Begin Image order exceeds the maximum image height supported by the product.

Alternate Exception Action: The image height is truncated at the maximum height supported.

X'03E100' Relative Line Outside Coordinate Space

Explanation: The relative line starts inside the drawing order coordinate space but goes outside.

Alternate Exception Action: None.

Specification Check-General - X'02'

The following exception codes are the valid codes for a general specification check condition:

X'020001' Embedded Text Control Code Error

Explanation: Undefined text control code.

Alternate Exception Action: Ignore the control sequence.

X'020201' End Suppression Text Control Error

Explanation: The active Begin Suppression ID within the current page, overlay, or page segment is not the same as that specified in the ES control.

There is no active suppression ID.

X'020202' Invalid IPDS Command Length

Explanation: The length for a command is not within the allowed range.

The length of a Request Resource List entry is not a valid or supported value.

The length specified for a Request Resource List entry does not match the number of bytes received.

Alternate Exception Action: None.

X'020205' Invalid Data Structured Field Length

Explanation: A data structured field has been received in a WGC or WBCC command that is less than the minimum allowable length.

Alternate Exception Action: None.

X'020302' IPDS Command Header Length too Small

Explanation: The length value of a command is less

than 5 (or less than 7 if a correlation ID is included).

Alternate Exception Action: None.

X'020305' Area Position Orientation is Not Supported

Explanation: The orientation specified in the Area Position structured field of the WGC or WBCC command is not a valid or supported value.

Alternate Exception Action: None.

X'020401' End Page Encountered During Active Suppression

Explanation: The End Page control was encountered before a text suppression ended.

Alternate Exception Action: Process the object as if the corresponding End Suppression control sequence appeared at the end of the object. That is, all of the data following the Begin Suppression control sequence in the object is processed and suppressed.

X'020402' Acknowledge Reply Response Continuation Request is Invalid

Explanation: The printer received a command whose response continuation bit is on but there is no response to continue.

Alternate Exception Action: None.

X'020405' Area Position Reference System is Not Supported

Explanation: The reference system specified in the Area Position structured field of the WGC or WBCC

command is not a valid or supported value.

Alternate Exception Action: None.

X'020501' Invalid Spanning Sequence

Explanation: A Write Text or Write Graphics command is required to complete a partial order, control, or double-byte character code and another command was received other than an XOA command.

Alternate Exception Action: None.

X'020502' Unsupported Baseline Move

Explanation: Unsupported advancement of the baseline coordinate toward the I-axis.

Alternate Exception Action: None.

X'020505' Structured Field Unit-Base Invalid

Explanation: The unit-base (measurement units) specified in the Output Control or the Data Descriptor structured field of the WGC or WBCC command is not a valid or supported value.

Alternate Exception Action: None.

X'020601' Begin Suppression Error

Explanation: Begin Suppression encountered in the same unit (page, segment or overlay) before previous suppression in that unit ended.

Alternate Exception Action: None.

X'020605' Structured Field Units Invalid

Explanation:

1. The units specified in the Output Control or the Data Descriptor structured field of the WGC or WBCC command is not a valid or supported value.
2. The result of the calculation cannot be represented in the printer. This may result from the WGC GDD window limits being very close together.
3. Coordinate overflow while scaling graphics. Possible if scaling coordinates require multiplication by a value greater than 1.

Alternate Exception Action: None.

X'020705' Structured Field Extents Not Supported

Explanation: The extents specified in the Output Control or Data Descriptor structured field of the WGC or WBCC command are not a valid or supported value.

The window values of the WGC GDD structured field are not consistent; therefore, the value of XL is larger than the value of XR or the value of YB is larger than the value of YT.

Alternate Exception Action: None.

X'020805' Invalid Mapping Option

Explanation: A mapping option specified in the Output Control structured field of the WGC or WBCC command is not a valid or supported value.

Alternate Exception Action: None.

X'020905' Invalid Axis Offsets

Explanation: The axis offsets specified in the Output Control structured field of the WGC or WBCC command are not valid or supported values.

Alternate Exception Action: None.

X'020B05' Invalid Structured Field Identifier

Explanation: A two-byte structured field identifier in a WGC or WBCC command is invalid or out of sequence.

Alternate Exception Action: None.

X'020F01' Invalid Text Orientation

Explanation: Baseline or Inline orientation specified in Set Text Orientation is not a valid or supported value.

Alternate Exception Action: Use an inline orientation of 0 degrees and a baseline orientation of 90 degrees.

X'021001' Invalid Margin

Explanation: The margin position is not a valid or supported value.

Alternate Exception Action: None.

X'021101' Invalid Baseline Increment

Explanation: The value of the baseline increment is not a valid or supported value.

Alternate Exception Action: None.

X'021201' Invalid Intercharacter Adjustment

Explanation:

1. The value of the intercharacter adjustment is not a valid or supported value.
2. The intercharacter adjustment direction is not a valid or supported value.

Alternate Exception Action:

1. Ignore the control sequence and continue presentation with the parameter values according to the hierarchy (the hierarchy is the last valid value received or if none received then use the LPD value).
2. Use direction = zero.

Note: In an LPD command, no Alternate Exception Action occurs.

X'021202' Font Storage is Full

Explanation: There is insufficient pattern storage to store the font transmitted with the Load Symbol Set command.

There is insufficient storage to load the data transmitted with the Load Font Equivalence command.

Alternate Exception Action: None.

X'021301' Invalid Absolute Move Baseline Value

Explanation: The Absolute Move Baseline parameter value is not a valid or supported value.

Alternate Exception Action: None.

X'021401' Invalid Absolute Move Inline Value

Explanation: The Absolute Move Inline parameter value is not a valid or supported value.

Alternate Exception Action: None.

X'021402' Font to be Deleted Not Found

Explanation: The single byte font specified by the Deactivate Font command is not in the machine.

Alternate Exception Action: None.

X'021403'

Explanation: Unsupported Baseline Move

Alternate Exception Action: None.

X'021502' Invalid DF Font

Explanation: The Loaded Font Identifier field is required in the Deactivate Font command; however, it is not present or its value is not a valid or supported value.

Alternate Exception Action: None.

X'021701' Invalid Variable Space Increment

Explanation: The value of the variable space increment as specified in a text control is not a valid or supported value.

Alternate Exception Action: None.

X'021702' Invalid DF Deletion Type

Explanation: The Deletion Type on a Deactivate Font command is not a valid or supported value.

Alternate Exception Action: None.

X'021802' Invalid Font ID**Explanation:**

1. The two-byte Font Identifier on a Load Symbol Set or Load Font Equivalence command is not a valid or supported value.
2. The one-byte Font Identifier value on the Load Font Equivalence command is not a valid or supported value.
3. A font is referenced on a Set Font control, a Logical Page Description, a Load Symbol Set, a Write Graphics, or Write Bar Code command, but the font has not been previously identified by the Load Font Equivalence command.
4. The font or symbol set referenced in a Logical Page Description, Write Text, or Write Graphics command is defined within the current Load Font Equivalence but is not loaded in the printer.

Alternate Exception Action:

1. None.
2. None.
3. Substitute the active font for the specified local font and continue processing.
4. Substitute the active coded font for the specified local font and continue processing.

X'021901' Repeat String Length Error

Explanation: The Repeat String target string length is not a valid or supported value.

Alternate Exception Action: None.

X'021902' Multiple Occurrences of the Same LFE Local ID

Explanation: The one-byte Local Identifier value in the Load Font Equivalence command has been used more than once, making the Two-Byte Font Identifier reference ambiguous.

Alternate Exception Action: None.

X'021C01' Invalid Embedded Text Control Sequence

Explanation: A text control sequence contains a code other than X'D3' following X'2B'.

Alternate Exception Action: None.

X'021D02' Invalid LFE Identifier

Explanation: One or more of the following font parameters listed in the LFE or their combination is not valid or supported: Character Set ID, Code Page ID, Uniform Character Increment, and Proportional Increment Coefficient Table.

Alternate Exception Action: None.

X'021E01' Invalid Text Control Length

Explanation: The length of a text control is not valid.

Alternate Exception Action: None.

X'021E02' Mismatch Between Font and XOA Print Quality Control

Explanation:

1. The combination of parameters specified in LFE are not supported together with the quality indicated by XOA Print Quality Control.
2. The Font (Style) ID specified in the LFE is invalid or unsupported or is not valid with the other font parameters.

Alternate Exception Action: Choose "Best Fit" font.

Note: This error will be flagged when an attempt to present the font is processed.

X'021F01' Repeat String Length Error

Explanation: Repeat String control on a Write Text command has nonzero fill count but zero string length.

Alternate Exception Action: None.

X'021F02' Mismatch of LFE Two-Byte Loaded Font ID Parameters

Explanation: Two fonts have been assigned the same two-byte Loaded Font ID by the LFE command, but one or more of the following attributes differ: Character Set ID, Code Page ID, Font (Style) ID, Uniform Character Increment, Proportional Increment Coefficient Table.

Alternate Exception Action: None.

X'022602' Invalid LSS X Box Size

Explanation: The Box X size, specified in Byte 6 of the Load Symbol Set command, is not a valid or supported value or is incompatible with the specified font.

Alternate Exception Action: None.

X'022702' Invalid LSS Y Box Size

Explanation: The Box Y size, specified in Byte 7 of the Load Symbol Set command, is not a valid or supported value or is incompatible with the specified font.

Alternate Exception Action: None.

X'022802' LSS Pattern Download Format Reserved or Not Supported

Explanation: The specified pattern download format in LSS is either a reserved value or not supported.

Alternate Exception Action: None.

X'022902' Invalid LSS Additional Parameter Byte Length

Explanation: The additional parameter byte length specified in the LSS command is outside the range X'0D' through X'FF' or is not a supported value.

Alternate Exception Action: None.

X'023101' Invalid LCC Number of Copies

Explanation: The Number of Copies value specified on the Load Copy Control command is not a valid or supported value.

Alternate Exception Action: Proceed as though the number of copies field stated 1.

X'023201' Invalid LCC Number of Copies

Explanation: There is an invalid or unsupported Load Copy Control keyword in the group entry.

Alternate Exception Action: None.

X'023401' Invalid LCC Copy Group Byte Count

Explanation:

1. The number of bytes in Load Copy Control group is not a multiple of two byte pairs.
2. The number of bytes in Load Copy Control group is not a valid or supported value.

Alternate Exception Action: None.

X'023601' Invalid or Unsupported Load Copy Control Simplex/Duplex Parameter

Explanation: The LCC command simplex/duplex parameter is invalid or unsupported.

Alternate Exception Action: If invalid, none. If unsupported, the printer prints simplex.

X'023A02' Maximum Number of Fonts Allowed by the Printer Exceeded

Explanation: An attempt was made to download more fonts than the printer can support.

Alternate Exception Action: None.

X'023F02' Font Index Not Loaded**Explanation:**

1. The font inline sequence in Load Font Equivalence command is not supported or not supported with the current Text Orientation.
2. The Font Index specified in a Load Font Equivalence command called out by a Set Coded Font Local text control is not loaded.

Alternate Exception Action: None.

X'024201' WIC Pel Count < Minimum Required

Explanation: The Target or Source Pel Count value on the Write Image Control command is less than 1.

Alternate Exception Action: None.

X'024301' WIC Pel Count > Maximum Allowed

Explanation: The Target or Source Pel Count value on the Write Image Control command is greater than the valid or supported maximum.

Alternate Exception Action: None.

X'024401' WIC Scan Count < Minimum Required

Explanation: The Target or Source Scan Count value on the Write Image Control command is less than 1.

Alternate Exception Action: None.

X'024501' WIC Scan Count > Maximum Allowed

Explanation: The Target or Source Scan Count value on the Write Image Control command is greater than the valid or supported maximum.

Alternate Exception Action: None.

X'024601' Invalid WIC Source Image Format**Explanation:**

1. The Compression Algorithm value (Byte 8) is not a valid or supported value.
2. The (Pel) Data Format value (Byte 9) in the Write Image Control command is not X'00'.

Alternate Exception Action: None.

X'024701' Invalid WIC Scale Factor Value**Explanation:**

1. The Pel Count Scale Factor value on the Write Image Control command is not a valid or supported value.
2. The Scan Count Scale Factor value on the Write Image Control command does not equal the Pel Count Scale Factor.

Alternate Exception Action: None.

X'024702' Invalid LFE Font Inline Sequence

Explanation: The Font Inline Sequence parameter in a Load Font Equivalence command is not a valid or supported value.

Alternate Exception Action: None.

X'024801' Invalid WIC Scan Line Direction

Explanation: The Scan Line Direction parameter value on the Write Image Control command is not a valid or supported value.

Alternate Exception Action: None.

X'024802' Invalid Font Section Number in LSS command

Explanation: The section number specified in the LSS command is not a valid or supported value.

Alternate Exception Action: None.

X'024901' Invalid WIC Scan Sequence Direction

Explanation: The Scan Line Sequence Direction value specified on the Write Image Control command is not plus ninety degrees from the Scan Line Direction value.

Alternate Exception Action: None.

Note: Plus ninety from 270, (X'8700') must be X'0000'.

X'024902' Invalid Starting Code Point in LSS command

Explanation: The Starting Code Point in the LSS command is not a valid or supported value.

Alternate Exception Action: None.

X'024A01' Invalid WIC Coordinate Specification**Explanation:**

1. The Coordinate Definition value on the Write Image Control command is not a valid or supported value.
2. The First Pel Location (X or I Direction) value on the Write Image Control command is not a valid or supported value.
3. The First Pel Location (Y or B Direction) value on the Write Image Control command is not a valid or supported value.

Alternate Exception Action: None.

X'024A02' Invalid WIC Coordinate Specification

Explanation: The Ending Code Point specified in the LSS command is not a valid or supported value.

Alternate Exception Action: None.

X'024B02' Invalid Bit Values in Flag Bytes of LSS Command

Explanation: One or more of the bits in the two Flags bytes of the LSS command Extended Form, Clear/Overstrike, Skip, APA/CB/OB, Use S. E. T. is not a valid or supported value.

Alternate Exception Action: None.

X'024C02' Invalid LSS Data Length

Explanation:

1. The LSS additional parameter byte length does not correlate with the LSS data length.
2. An LSS self-identifying field length is not a valid or supported value or does not correlate with the LSS data length.
3. The amount of bit image data in the LSS command does not correspond with the number of code points, box size, and pattern download format.

Alternate Exception Action: None.

X'025301' Invalid WIC Color Value

Explanation: The Color value of the WIC command is not a valid or supported value.

Alternate Exception Action: Use printer default value.

X'025503' Unsupported Color or Color Attribute

Explanation:

1. The text color is not a valid or supported value.
2. The text color precision is not a valid or supported value.

Alternate Exception Action: If the attribute value is not valid, ignore the control and continue presentation with the value that was in effect prior to this control sequence. If the attribute value is valid but unsupported for this printer, use the printer default color.

X'026002' Invalid LPD X Units/Unit-Base

Explanation: On the Logical Page Description command, the X units per unit-base value is not a valid or supported value.

Alternate Exception Action: None.

X'026102' Invalid LPD Y Units/Unit-Base

Explanation:

1. On the Logical Page Description command, the Y units per unit-base value is not a valid or supported value.
2. On the Set Media Size command, the units per unit-base value is not a valid or supported value.

Alternate Exception Action: None.

X'026202' Invalid LPD X-Extent

Explanation: On the Logical Page Description command, the X-Extent is not a valid or supported value.

Alternate Exception Action: None.

X'026302' Invalid LPD Y-Extent

Explanation: On the Logical Page Description command, the Y-Extent is not a valid or supported value.

Alternate Exception Action: None.

X'026401' Insufficient Control Storage for Image

Explanation: There is insufficient control storage to print the image data transmitted with the Write Image command.

Alternate Exception Action: None.

X'026402' Invalid LPD Unit-Base

Explanation: On the Logical Page Description command, the unit-base is not a valid or supported value.

Alternate Exception Action: None.

X'026802' Invalid LPD Inline Direction

Explanation: On a Logical Page Description command the Inline Sequence Direction value is not a valid or supported value.

Alternate Exception Action: Use an inline sequence direction of 0 degrees and a baseline sequence direction of 90 degrees.

X'026902' Invalid LPD Baseline Direction

Explanation: On a Logical Page Description command the Baseline Sequence Direction value is not a valid or supported value.

Alternate Exception Action: Use an inline sequence direction of 0 degrees and a baseline sequence direction of 90 degrees.

X'026A01' Insufficient Source Image Data

Explanation: The number of source image bytes received < the number implied in the Write Image Control command.

Alternate Exception Action: None.

X'026A02' Invalid LPD Initial Inline Coordinate

Explanation: On a Logical Page Description command, the initial inline coordinate value is not a valid or supported value.

Alternate Exception Action: None.

X'026B01' Excess Source Image Data

Explanation: The number of source image bytes received > the number implied in the Write Image Control command.

Alternate Exception Action: None.

X'026B02' Invalid LPD Initial Baseline Coordinate

Explanation: On a Logical Page Description command, the initial baseline coordinate value is not a valid or supported value.

Alternate Exception Action: None.

X'027002' Invalid Units Value in an XOH SMS Command

Explanation: The units value in an XOH SMS command is invalid or unsupported.

Alternate Exception Action: None.

X'027202' Invalid SMS X-Extent

Explanation: On the Set Media Size command, the X-extent is not a valid or supported value.

Alternate Exception Action: None.

X'027302' Invalid SMS Y-Extent

Explanation: On the Set Media Size command, the Y-extent is not a valid or supported value.

Alternate Exception Action: None.

X'027402' Invalid SMS Unit Base

Explanation: On the Set Media Size command, the unit-base is not a valid or supported value.

Alternate Exception Action: None.

X'028101' Insufficient Storage for Overlay or Page Segment

Explanation: There is insufficient storage to process an overlay or page segment.

Alternate Exception Action: None.

X'028501' Invalid DO Parameter Value

Explanation: The Overlay Identifier on the Deactivate Overlay command is not a valid or supported value.

Alternate Exception Action: None.

X'028A01' Invalid DPS Parameter Value

Explanation: The Page Segment Identifier on the Deactivate Page Segment command is not a valid or supported value.

Alternate Exception Action: None.

X'029001' Overlay Number Outside Valid Range

Explanation:

1. The Overlay Identifier on the Begin Overlay command is not a valid or supported value.
2. The Overlay Identifier on the Include Overlay command is not a valid or supported value.
3. The Overlay Identifier on a Load Copy Control command is not a valid or supported value.

Alternate Exception Action: None.

X'029101' BO Overlay Number Already Loaded

Explanation: The host attempted to download an overlay from the Begin Overlay command that already exists in the printer.

Alternate Exception Action: None.

X'029102' Invalid Request Resource List Parameter

Explanation:

1. The Requested Ordering parameter of a Request Resource List order is not a valid or supported value.
2. The Entry Index parameter of a Request Resource List order is not a valid or supported value.
3. The Resource Qualifier parameter of a Request Resource List order is not a valid or supported value.
4. The Resource Type parameter on the Request Resource List order is not a valid or supported value.

Alternate Exception Action: None.

X'029201' Overlay Number Not Loaded

Explanation: The overlay identified by the Overlay Identifier on the Include Overlay, Deactivate Overlay or LCC command was not loaded or was already deleted prior to its attempted use.

Alternate Exception Action: None.

X'029202' Invalid Print Quality Control Parameter:

Explanation: The Print Quality Control parameter is X'00', which is a reserved value.

Alternate Exception Action: None.

X'029301' Recursive Overlay Invocation:

Explanation: An infinite nesting loop has occurred with the Include Overlay command (for example, an overlay has included itself).

Alternate Exception Action: None.

X'029401' Recursive Overlay Invocation:

Explanation:

1. The Page Segment Identifier on the Include Page Segment command is not a valid or supported value.
2. The Page Segment Identifier on the Begin Page Segment command is not a valid or supported value.

Alternate Exception Action: None.

X'029501' Page Segment Number Already Loaded

Explanation: The host attempted to download a page segment that already exists in the printer.

Alternate Exception Action: None.

X'029601' Page Segment Number Not Loaded

Explanation: The page segment identified by the Page Segment Identifier on the Include Page Segment or Deactivate Page Segment command was not loaded or was already deleted prior to its attempted use.

Alternate Exception Action: None.

X'029701' Overlay Nesting Limit Exceeded

Explanation: Depth of overlay nesting is greater than the maximum depth.

Alternate Exception Action: None.

X'029801' Suppression Number Outside Valid Range

Explanation:

1. On a Write Text command, the Begin Suppression number value is not a valid or supported value.
2. In a LCC command, the suppression number value is not a valid or supported value.

Alternate Exception Action:

1. Ignore the control sequence.
 2. None.
-

X'029803' Temporary Baseline Move Error

Explanation:

1. The temporary baseline increment is not a valid or supported value.
2. The temporary baseline move direction is not a valid or supported value.
3. The temporary baseline move precision is not a valid or supported value.
4. Unsupported multiple offset temporary baseline move.
5. Unable to support temporary baseline move by printing full size characters.

Alternate Exception Action:

1. None for reasons 1 through 4.
 2. For reason 5, present according to the substitution method.
-

X'02A401' Logical-page boundary in the X-direction cannot be represented

Explanation: In either the page or page overlay, the sum of the logical page origin and the logical page size in the X direction exceeds the maximum supported.

Alternate Exception Action: None.

X'02A501' Logical-page boundary in the Y-direction cannot be represented

Explanation: In either the page or page overlay, the sum of the logical page origin and the logical page size in the Y direction exceeds the maximum supported.

Alternate Exception Action: None.

X'02AC01' Insufficient Storage to Print the Sheet

Explanation: Page is too large for main storage.

Alternate Exception Action: None.

X'02AD01' Invalid Logical Page Position Parameter

Explanation: The X Coordinate value on the Logical Page Position command is not a valid or supported value.

The Y Coordinate value on the Logical Page Position command is not a valid or supported value.

Alternate Exception Action: None.

X'02AE01' Invalid Include Overlay Position Parameter

Explanation:

1. The X-Coordinate value on the Include Overlay command is not a valid or supported value.
2. The Y-Coordinate value on the Include Overlay command is not a valid or supported value.

Alternate Exception Action: None.

X'02C101' Maximum Number of Simplex Keywords in an LCC Command

Explanation: More than one simplex operation keyword has been specified in an LCC command copy group.

Alternate Exception Action: None.

X'02C102' Load Equivalence Internal Value Not Unique

Explanation: The first two bytes of two or more list entries on the Load Equivalence command are not unique. Setting both external values to the same value will not prevent the error.

Alternate Exception Action: None.

X'02C602' Invalid Load Equivalence Mapping Type

Explanation: The Mapping Type on the Load Equivalence command is not X'0100'.

Alternate Exception Action: None.

X'02C801' An unsupported Input Media Source ID was Specified

Explanation: An unsupported Input Media Source ID was specified in an XOH-SIMS command.

Alternate Exception Action: None.

X'02C802' Invalid Internal/External Value on LE

Explanation: The Internal or External value on a Load Equivalence command is not a valid or supported value.

Alternate Exception Action: None.

Conditions Requiring Host Notification - X'01'

X'010100'	Media Size or Input Media Source ID Changed
-----------	--

Explanation:

1. The size of the media in one or more of the installed input media sources was changed.
2. The input media source ID of one or more of the installed input media sources was changed.

Alternate Exception Action: None.

Note: Not reported in 4224 Emulation Mode.

Chapter 6. Print Samples and IPDS Coding Example

The following pages contain examples of the printing capabilities of the 4247 Printer and one IPDS coding example.

Text Print Samples

Various print styles are available with this printer. The data stream sent by the host computer determines the print style, characters per inch, and character set.

There are four print qualities available:

- This is Fast Draft Mode
(model Z03 only),
- This is DP mode,
printed in the Gothic font,
- This is DP Text mode,
printed in the Courier font.
- This is NLQ mode,
printed in the Courier font.


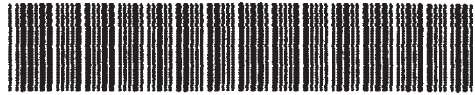

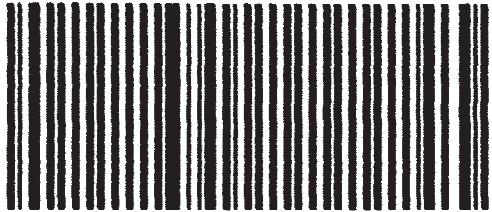

Pitches include:

- 10 characters per inch,
- 12 characters per inch,
- 15 characters per inch
- 16.7 characters per inch
in DP quality

Printer can also be Underscored to emphasize important points.

Bar Codes

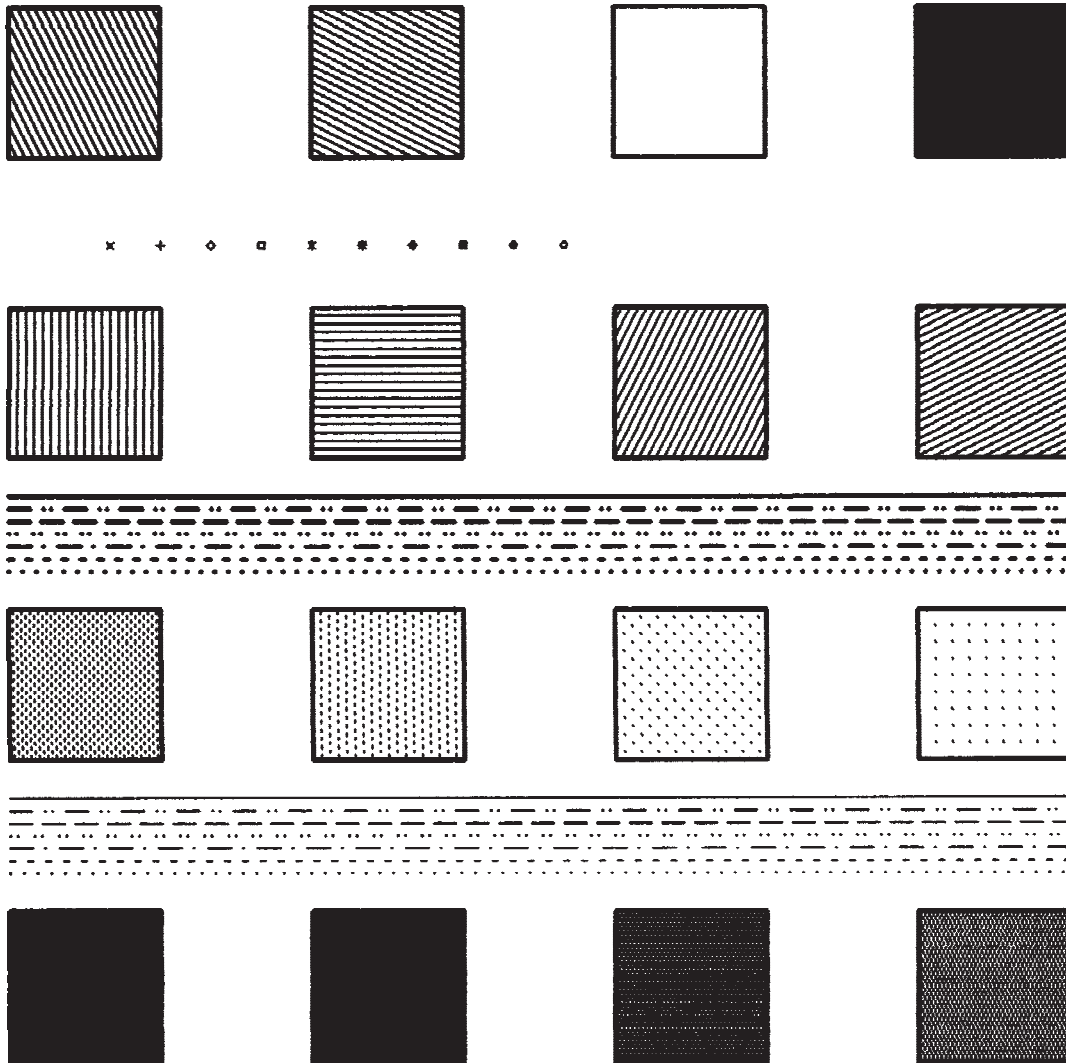
The following are sample bar code labels printed with the 4247 Printer:

<p>Item Label (UPC-A/EAN-13)</p>  <p>0 123456789876</p>	<p>LOGMARS Label (Code 3 of 9)</p>  <p>3631004567416</p> <p>FSCM 57685 MFR/PN 301 CARBURETOR 6 EA DAAG-25-82-0056 A 12/91</p>
<p>HIBCC Supplier Label (Code 3 of 9)</p>  <p>*+A123B4C5D6E711*</p>	
<p>Retail Shipping Label (Code 128)</p>  <p>00000288280000000019</p>	
<p>USPS Mailing Label (Postnet)</p>  <p>Mr. Mailer Box 1234 Riverside, IA 52337-1234</p>	

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Graphics Patterns

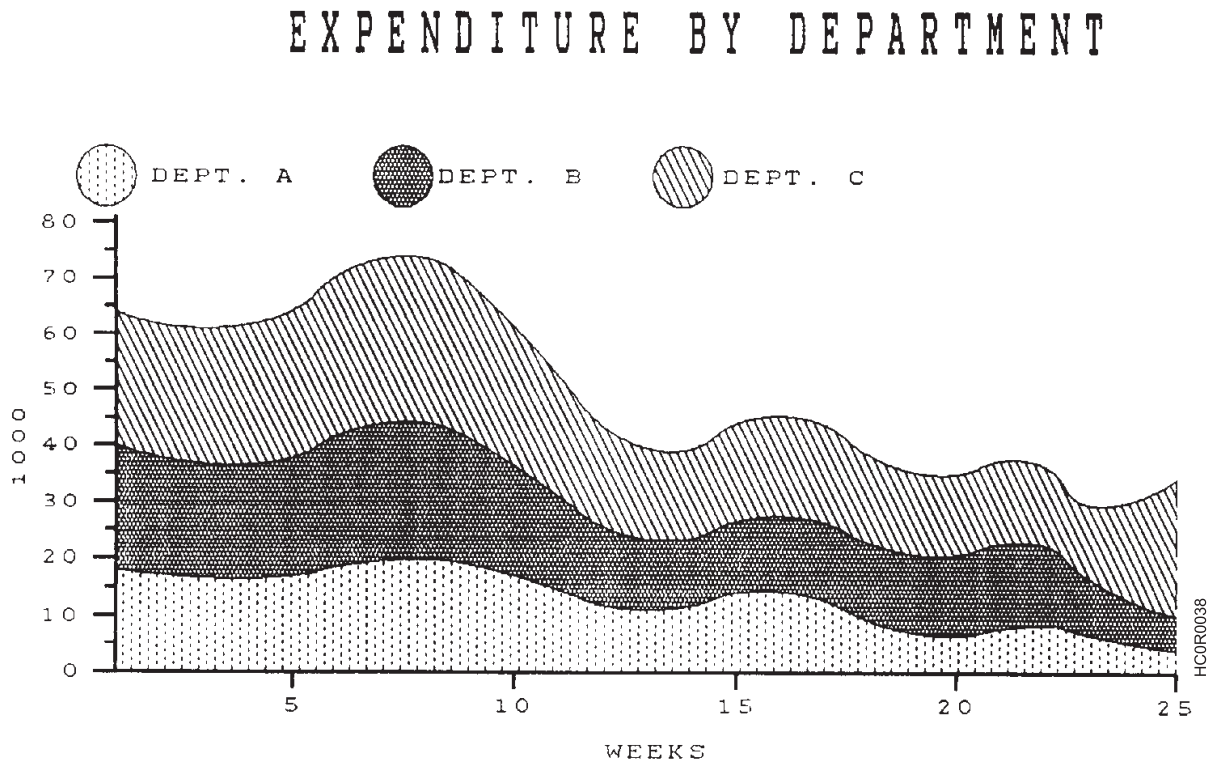
The following example shows the area fill patterns, line widths, line types, and marker symbols available with this printer.



HC0R0037

Graphics Example

The following drawing is an example of the graphics capabilities of the 4247 Printer. The actual IPDS graphics data stream commands necessary to draw this graphic follow the example.



Data Stream for Graphics Example

```
***** BEGIN PAGE
0009D6AF0000000000
***** Write Graphics Control
003CD68400000BAC6B000000000000A0
0010A66B0038403DE030001000000000
001CA6BB00003840384000000000DB0010001000F000
000000000000
***** Write Graphics Command Header
037FD68500
***** Begin Segment
700C000000000000036C00000000
***** Set Character Cell Size
3304010E021C
***** Character String
C31DF32B0E10
***** String Data - EXPENITURE BY DEPARTMENT
C5E7D7C5D5C4C9E3E4D9C540C2E840C4C5D7C1D9E3D4C5D5E3
***** Character String
C313F8710BF4
***** String Data - FIRST HALF 1979
C6C9D9E2E340C8C1D3C640F1F9F7F9
***** Key Circles, Set Line Type979
1800
***** Color
0A00
***** Set Pattern Symbol
2806
```

```

***** Begin Area
6840
***** Full Arc
C706ED680A8CF000
***** End Area
6000
***** Color
0A00
***** Set Pattern Symbol
2803
***** Begin Area
6840
***** Full Arc
C706F6DC0A8CF000
***** End Area
6000
***** Color
0A00
***** Set Pattern Symbol
280D
***** Begin Area
6840
***** Full Arc
C706FFB00A8CF000
***** End Area
6000
***** Color
0A00
***** Set Pattern Symbol
280D
***** Set Line Type
1800
***** Begin Area
6840
***** Fillet
C528EDB80654F1F00492F6280924
FA6000654FE98008702D00438070800FA
0B4002760CA8FF1F0F78010E
***** Set Line Type
1803
***** Line At Current Position
810C0F78FB14EDBBFB14EDB80654
***** End Area
6000
***** Color
0A08
***** Set Pattern Symbol
2800
***** Set Line Type
1800
***** Begin Area
6840
***** Fillet
C528EDB8021CF1F00087F628
0384FA6001C2FE98FE3E02D0
00B40708FE110B40FFA60CA8
FD8A0F78FCD6
***** Set Line Type
1808
***** Line At Current Position
810C0F78FB14EDB8FB14EDB8021C
***** End Area
6000
***** Color
0A00
***** Set Pattern Symbol
2803

```

```

Set Line Type
1800
***** Begin Area
6840
***** Fillet
C528EDB8021CF1F00087F628
0384FA6001C2FE98FE3E02D0
00B40708FE110B40FFA60CA8FD8A0F78FCD6
***** Set Line Type
1808
***** Line
810C0F78FB14EDB8FB14EDB8021C
***** End Area
6000
***** Color
0A08
***** Set Pattern Symbol
2800
***** Set Line Type
1800
***** Begin Area
6840
***** Fillet
C528EDB8FE3EF1F0FD8AF628
FEC5FA60FE3EFE98FC7C02D
FE3E0708FBC80B40FCD6
0CA8FC220F78FBC8
***** Set Line Type
1808
***** Line At Current Position
810C0F78FB14EDB8FB14EDB801C2
***** End Area
6000
***** Color
0A00
***** Set Pattern Symbol
2806
***** Set Line Type
1800
***** Begin Area
6840
***** Fillet
C528EDB8FE3EF1F0FD8AF628
FEC5FA60FE3EFE98FC7C02D0FE3E0708FBC80B40FCD6
0CA8FC220F78FBC8
***** Set Line Type
1808
***** Line At Current Position
810C0F78FB14EDB8FB14EDB801C2
***** End Area
6000
***** Axes and Tic Marks, Set Line Type
1800
***** Set Line Width
1902
***** Color
0A00
***** Line
C108EDB8FB14EDB80951
***** Line
C108EDB8FB140F78FB14
***** Line
C108EDB8FB14ED04FB14
***** Line
C108EDB8FCD6ED04FCD6
***** Line
C108EDB8FE98ED04FE98

```

```

***** Line
C108EDB8005AED04005A
***** Line
C108EDB8021CED04021C
***** Line
C108EDB803DEED0403DE
***** Line
C108EDB805A0ED0405A0
***** Line
C108EDB80762ED040762
***** Line
C108EDB80924ED040924
***** Line
C108EDB8FBF5ED5EFBF5
***** Line
C108EDB8FDB7ED5EFDB7
***** Line
C108EDB8FF79ED5EFF79
***** Line
C108EDB8013BED5E013B
***** Line
C108EDB802FDED5E02FD
***** Line
C108EDB804BFED5E04BF
***** Line
C108EDB80681ED5E0681
***** Line
C108EDB80843ED5E0843
***** Line
C108F358FB14F358FA8D
***** Line
C108FA60FB14FA60FA8D
***** Line
C1080168FB140168FA8D
***** Line
C1080870FB140870FA8D
***** Line
C1080F78FB140F78FA8D
***** Letters and Numbers, Set Character Cell
330400000000
***** Character String, DEPT. A
C30BEEC60A32
C4C5D7E34B40C1
***** Character String, DEPT. B
C30BF7EA0A32
C4C5D7E34B40C2
***** Character String, DEPT. C
C30B00E10A32
C4C5D7E34B40C3
***** Character String, 5
C305F2FEF9AC
F5
***** Character String, 10
C306F9ACF9AC
F1F0
***** Character String, 15
C30600BAF9AC
F1F5
***** Character String, 20
C30607BCF9AC
F2F0
***** Character String, 25
C3060EC4F9AC
F2F5
***** Character String, WEEKS
C309FD30F844
E6C5C5D2E2

```

```

***** Character String, 80
C306EB4208ca
F8F0
***** Character String, 70
C306EB420708
F7F0
***** Character String, 60
C306EB420546
F6F0
***** Character String, 50
C306EB420384
F5F0
***** Character String, 40
C306EB4201C2
F4F0
***** Character String, 30
C306EB420000
F3F
***** Character String, 20
C306EB42FE3E
F2F0
***** Character String, 10
C306EB42FC7C
F1F0
***** Character String, 0
C305EBF6FABA
F0

***** Character Angle
3404000005A0
***** Character String, 1000
C308EAE800B4
F1F0F0F0
***** END
0005D65D00
***** END PAGE
0005D6BF00

```

IPDS Coding Example

The 4247 Printer produced this example of text, bar codes, and block graphic characters printing on the front continuous forms paper source. The code used to print the example appears in Figure 30.

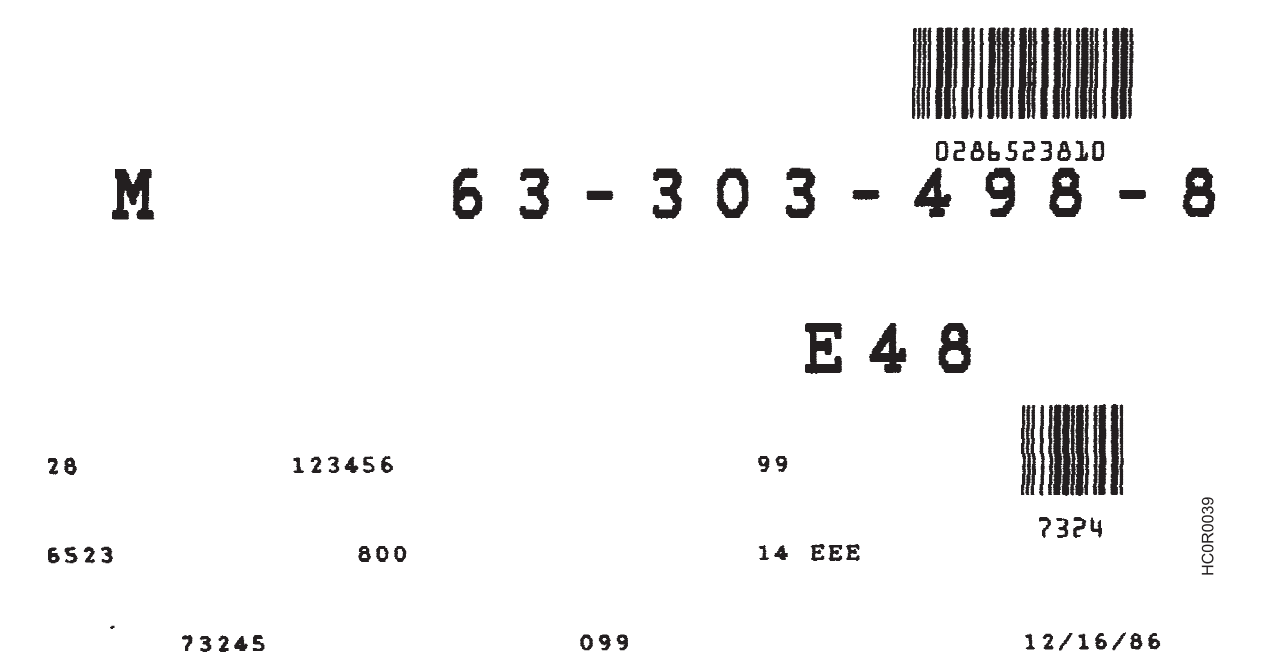


Figure 30. Print Sample from an IPDS Application Program

The following chart is an example of an IPDS application program that prints the block graphic characters, two bar codes, and text information shown in Table 9, printing on the front continuous forms paper source. The first column (IPDS Commands) contains abbreviations of the IPDS instructions that are coded in column 2. Column 2 (Hexadecimal Code) contains the hexadecimal code that produces the characters, bar codes, and text pictured in Table 9. Column 3 (Code Explanation) explains each command element.

When the application is actually coded, the hexadecimal code of each command may be entered in one stream. The IPDS command abbreviations in the first column and the explanation of each part of the command in the last column, are comments.

Table 9. IPDS Coding Example

IPDS Command	Hexadecimal Code	Code Explanation
*****	Printer Initialization	
SHS	0005	Control Length
—	D697	Set Home State
—	00	Flag Byte
X0A(EHC)	000A	Control Length
—	D633	Execute Order Any State
—	00	Flag Byte
—	F600	Exception Handling Order
—	C1	Report All Exceptions
—	01	Do Not Take Alternate Action

Table 9. IPDS Coding Example (continued)

IPDS Command	Hexadecimal Code	Code Explanation
—	01	Print All Data and Exit
XOA(DBD)	0007	Control Length
—	D633	Execute Order Any Style
—	00	Flag Byte
—	F200	Discard Buffer Data
LPD	0030	Control Length
—	D6CF	Load Page Descriptor
—	00	Flag Byte
—	00	Units Base Value equals (10 in.)
—	00	Reserved
—	3840	X Units per Base Value
—	3840	Y Units per Base Value
—	00	Reserved
—	003570	Width of Page (Units)
—	00	Reserved
—	001EF0	Length of Page (Units)
—	00	Reserved
—	00	No Ordered Page
—	0000	Reserved
—	00000000	Reserved
—	0000	Reserved
—	0000	X-Axis Orientation (0 degrees)
—	2D00	Y-Axis Orientation (90 degrees)
—	0000	Initial X Displacement
—	0000	Initial Y Displacement
—	0000	Initial Left Margin
—	0000	Intercharacter Increment
—	0000	Reserved
—	FFFF	Baseline Increment (Use Default)
—	FF	Local Font ID (Use Default)
—	FFFF	Text Color (Use Default)
LPP	000F	Control Length
—	D66D	Load Page Position
—	00	Flag Byte
—	00	Reserved
—	000000	X Displacement
—	00	Reserved
—	000000	Y Displacement
—	0000	Reserved
XOH(SMS)	000E	Control Length

Table 9. IPDS Coding Example (continued)

IPDS Command	Hexadecimal Code	Code Explanation
—	D68F	Execute Order Home State
—	00	Flag Byte
—	1700	Set Media Size (SMS)
—	00	Units Base Value equals (10 in.)
—	3840	Units per Base Value
—	3570	X-Extent of Physical Medium
—	1EF0	Y-Extent of Physical Medium
LFE	0015	Control Length
—	D63F	Load Font Equivalence
—	00	Flag Byte
—	07	Local ID
—	0007	Loaded Font ID
—	0000	Character Rotation (0 degrees)
—	0000	Reserved
—	0025	Code Page ID (USA)
—	000B	Font Style ID (10 CPI, Courier)
—	0000	Reserved
—	00	Reserved
—	80	Font Attribute (In printer)
—	00	Reserved
XOA(PQC)	0008	Control Length
—	D633	Execute Order Any State
—	00	Flag Byte
—	F800	Print Quality Control
—	AB	Select NLQ
XOH(SIMS)	0008	Control Length
—	D68F	Execute Order Home State
—	00	Flag Byte
—	1500	Select Input Media Source
—	00	Front Paper Source
*****	Begin Page	
BP	0009	Control Length
—	D6AF	Begin Page
—	00	Flag Byte
—	00000000	Data ** Ignored
*****	Write Text Data	

Table 9. IPDS Coding Example (continued)

IPDS Command	Hexadecimal Code	Code Explanation
WT	0014	Control Length
—	262D	Write Text
—	00	Flag Byte
—	2BD3	Escape Sequence
—	03F107	Set Coded Font Local
—	04C709D8	Absolute Move Inline
—	04D20F78	Absolute Move Baseline
—	F2F8	Data '28'
WT	0011	Control Length
—	D62D	Write Text
—	00	Flag Byte
—	2BD3	Escape Sequence
—	04C61194	Absolute Move Inline
—	F1F2F3F4F5F6F	Data '123456'
WT	000D	Control Length
—	D62D	Write Text
—	00	Flag Byte
—	2BD3	Escape Sequence
—	04C62058	Absolute Move Inline
—	F9F9	Data '99'
WT	0013	Control Length
—	D62D	Write Text
—	00	Flag Byte
—	2BD3	Escape Sequence
—	04C709D8	Absolute Move Inline
—	04D21248	Absolute Move Baseline
—	F6F5F2F3	Data '6523'
WT	000E	Control Length
—	D62D	Write Text
—	00	Flag Byte
—	2BD3	Escape Sequence
—	04C613B0	Absolute Move Inline
—	F8F0F0	Data '800'
WT	0011	Control Length
—	D62D	Write Text
—	00	Flag Byte
—	2BD3	Escape Sequence
—	04C62058	Absolute Move Inline
—	F1F4FFC5C5C5	Data '14 EEE'
WT	0014	Control Length

Table 9. IPDS Coding Example (continued)

IPDS Command	Hexadecimal Code	Code Explanation
—	D62D	Write Text
—	00	Flag Byte
—	2BD3	Escape Sequence
—	04C70E10	Absolute Move Inline
—	04D21518	Absolute Move Baseline
—	F7F3F2F4F5	Data '73245'
WT	000E	Control Length
—	D62D	Write Text
—	00	Flag Byte
—	2BD3	Escape Sequence
—	04C61AB8	Absolute Move Inline
—	F0F9F9	Data '099'
WT	0013	Control Length
—	D62D	Write Text
—	00	Flag Byte
—	2BD3	Escape Sequence
—	04C628C8	Absolute Move Inline
—	F1F262F1F661F8F6	Data '12/16/86'
*****	Write Graphics Control	
WGC	002C	Control Length
—	D684	Write Graphics Control
—	00	Flag Byte
(GAP)	000B	Field Length
—	AC6B	Graphics Area Position Control
—	0000	Inline (X) Coordinate Position
—	0000	Baseline (Y) Coordinate Position
—	0000	Orientation (0 degrees)
—	A0	Absolute X, Absolute Y
(GDD)	001C	Field Length
—	A6BB	Graphics Data Descriptor
—	00	Unit Base (10 in.)
—	00	Reserved
—	3840	X Units/Unit Base
—	3840	Y Units/Unit Base
—	00000000	Reserved
—	0000	X Left Limit of Window
—	3570	X Right Limit of Window
—	1EF0	Y Top Limit of Window

Table 9. IPDS Coding Example (continued)

IPDS Command	Hexadecimal Code	Code Explanation
—	0000	Y Bottom Limit of Window
—	00000000	Reserved
—	0000	Graphics Flags ** Ignored
*****	Write Graphics	
WG	003D	Control Length
—	D685	Write Graphics
—	00	Flag Byte
(BSI)	70	Begin Segment Introducer
—	0C	Length of Following Parameter
—	00000000	Reserved
—	00	Flags
—	06	Append Segment
—	002A	Length of Segment
—	00000000	Reserved
(SCCS)	33	Set Character Cell Size
—	04	Length of Data
—	021C	Width of Cell
—	02D0	Height of Cell
(SCS)	38	Set Character String
—	07	Local Character Set ID
(CS)	05	Character String
—	C3	Field String
—	0BF4	X Coordinate (Units)
—	1734	Y Coordinate (Units)
—	D4	Data 'M'
(CS)	C3	Character String
—	10	Field Length
—	1680	X Coordinate (Units)
—	1734	Y Coordinate (Units)
—	F6F3CAF3F0F3CA	Data '63-303-498-8'
—	F4F9F8CAF8	
(CS)	C3	Character String
—	07	Field Length
—	21C0	X Coordinate (Units)
—	1248	Y Coordinate (Units)
—	C5F4F8	Data 'E48'
END	0005	Control Length
—	D65D	End (Graphics)

Table 9. IPDS Coding Example (continued)

IPDS Command	Hexadecimal Code	Code Explanation
—	00	Flag Byte
*****	Write Bar Code Control	
WBCC	002B	Control Length
—	D680	Write Bar Code Control (BC)
—	00	Flag Byte
(BCAP)	000B	Field Length
—	AC6B	BC Area Position Control
—	0000	X Coordinate of BC Area
—	0000	Y Coordinate of BC Area
—	0000	Orientation of Bar Code (0 Degrees)
—	A0	Absolute X, Absolute Y
(BCDD)	001B	Field Length
—	A6EB	Bar Code Data Descriptor
—	00	Unit Base (10 in.)
—	00	Reserved
—	3840	X Units/Unit Base
—	3840	Y Units/Unit Base
—	3840	X Extent of Block (Width)
—	2FD0	Y Extent of Block (Height)
—	0000	Reserved
—	0C	Bar Code Type (2 of 5 Interleaved)
—	01	No Check Digit
—	FF	User Printer Default LFID
—	0000	Select Color (Black)
—	0E	Unit Module Width (.014 in.)
—	02D0	Element Height (720 Units)
—	01	Height Multiplier
—	0019	Wide/Narrow Ratio
*****	Write Bar Codes	
WBC	0013	Control Length
—	D681	Write Bar Code
—	00	Flag Byte
—	20	Bar Code Flag
—	2544	X Coordinate
—	0168	Y Coordinate
—	F2F8F6F5F1F3F8F1F0	Data '286523810'

Table 9. IPDS Coding Example (continued)

IPDS Command	Hexadecimal Code	Code Explanation
WBC	00E	Control Length
—	D681	Write Bar Code
—	00	Flag Byte
—	20	Bar Code Flag
—	28C8	X Coordinate
—	0D5C	Y Coordinate
—	F7F3F2F4	Data '7324'
END	0005	Control Length
—	D65D	End (Bar Code)
—	00	Flag Byte
*****	End of Page	
EP	0005	Control Length
—	D6BF	End Page
—	00	Flag Byte

Appendix A. Code Pages

The EBCDIC code charts page 231 contains information about the code pages that the 4247 Model X03/Z03 Printers use on the Ethernet IPDS attachments. See the “ASCII Code Pages” on page 277 for information about the code pages for Ethernet ASCII attachments. You can use the following charts to determine the actual character printed for any code page and font combination.

EBCDIC Code Pages

The table below lists the EBCDIC code pages used by the 4247 Printer, and also provides page references so you can determine what code page contains the characters you want to use.

Code Page	Character Set Name	Page
37	USA/Canada/Canadian Bilingual	233
260	Canadian French	234
273	Austrian/German	235
274	Belgian Old	236
275	Brazilian	237
277	Danish/Norwegian	238
278	Finnish/Swedish	239
280	Italian	240
281	Japanese English	241
282	Portuguese	242
284	Spanish/Spanish Speaking	243
285	English (UK)/Ireland	244
290	Japanese Katakana	245
297	French/French Azerty	246
420	Arabic	247
423	Greek (Old)	248
424	Hebrew Bulletin	249
500	International 5/Swiss/Belgian	250
813	Greek/Latin (ISO 8859-7) + euro	251
833	Korean	252
838	Thai	253
870	Latin 2/ROECE	254
871	Icelandic	255
875	Greek New + euro	256
880	Cyrillic	257
890	Yugoslav (Old)	258
892	OCR-A	259
893	OCR-B	260
924	Latin 9 (ISO 8859) + euro	261
1025	Cyrillic Multilingual	262

Code Page	Character Set Name	Page
1026	Latin-5 Turkey	263
1097	Farsi	264
1112	Baltic Multilingual	265
1122	Estonian	266
1140	USA/Canada + euro	267
1141	Austrian/German + euro	268
1142	Danish/Norwegian + euro	269
1143	Finnish/Swedish + euro	270
1144	Italian + euro	271
1145	Spanish/Spanish Speaking + euro	272
1146	English/UK + euro	273
1147	French + euro	274
1148	International 5/Belgian New + euro	275
1149	Icelandic + euro	276

USA/Canada/Canadian Bilingual

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	^ SD150000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¡ SM650000	: SP130000	« SP170000	ª SM210000	ï SP030000	[SM060000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	]	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	✕ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00037

Canadian French

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000						é LE110000	è LE130000	¸ SD410000	0 ND100000
-1			/ SP120000	É LE120000	a LA010000	j LJ010000	¨ SD170000		A LA020000	J LJ020000		1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000		B LB020000	K LK020000	S LS020000	2 ND020000
-3		ë LE170000		Ë LE180000	c LC010000	l LL010000	t LT010000		C LC020000	L LL020000	T LT020000	3 ND030000
-4			À LA140000	È LE140000	d LD010000	m LM010000	u LU010000		D LD020000	M LM020000	U LU020000	4 ND040000
-5					e LE010000	n LN010000	v LV010000		E LE020000	N LN020000	V LV020000	5 ND050000
-6		î LI150000		Î LI160000	f LF010000	o LO010000	w LW010000		F LF020000	O LO020000	W LW020000	6 ND060000
-7		ï LI170000		Ï LI180000	g LG010000	p LP010000	x LX010000		G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000		Ç LC420000		h LH010000	q LQ010000	y LY010000		H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9				` SD130000	i LI010000	r LR010000	z LZ010000		I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	à LA130000	´ SD110000	ù LU130000	:								
-B	· SP110000	\$ SC030000	, SP080000	# SM010000					ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000						ü LU170000		Ü LU180000
-D	(SP060000	) SP070000	— SP090000	´ SP050000								Û LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000								
-F	! SP020000	^ SD150000	? SP150000	" SP040000								(EO)

Code Page 00260

Austrian/German

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	ä LA170000	ü LU170000	Ö LO180000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ß LS610000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE170000	[SM060000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	@ SM050000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	~ SD190000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Ä LA180000	Ü LU180000	ö LO170000	: SP130000	« SP170000	ä SM210000	ï SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	§ SM240000	ð LD630000	æ LA510000	Ð LD620000	¬ SM150000	¡ SM650000	}	\	\] SM080000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	✕ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00273

Belgian Old

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	é LE110000	è LE130000	ç LC410000	0 ND100000
-1	(RSP) SP300000	{ SM110000	/ SP120000	É LE120000	a LA010000	j LJ010000	“ SD170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	@ SM050000	} SM140000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	\ SM070000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	ù LU130000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	à LA130000	ð LD630000	æ LA510000	Ð LD620000	– SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	~ SD190000	ò LO130000	! SM650000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	ϝ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00274

Brazilian

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	õ LO190000	é LE110000	\ SM070000	0 ND100000
-1	(RSP) SP300000	} SM140000	/ SP120000	[SM060000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	` SD130000	î LI150000	@ SM050000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	! SM650000	ì LI130000	] SM080000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	ã LA190000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	É LE120000	\$ SC030000	ç LC410000	: SP130000	« SP170000	ª SM210000	ï SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	Ç LC420000	, SP080000	Õ LO200000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ã LA200000	ð LD630000	æ LA510000	Ð LD620000	– SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	☒ SC010000	® SM530000	× SA070000	{ SM110000	ÿ LY170000	# SM010000	(EO)

Code Page 00275

Danish/Norwegian

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ı SM650000	@ SM050000	° SM190000	μ SM170000	¢ SC040000	æ LA510000	å LA270000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	}	ï LI170000	\$ SC030000	İ LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	# SM010000	☉ SC010000	ø LO610000	: SP130000	« SP170000	̂ SM210000	ı SP030000	⌋ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	Å LA280000	, SP080000	Æ LA520000	» SP180000	̇ SM200000	ı SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ø LO620000	ð LD630000	{ SM110000	Ð LD620000	ˉ SM150000	ö LO170000	~ SD190000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	‚ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	[SM060000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00277

Finnish/Swedish

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	ä LA170000	å LA270000	É LE120000	0 ND100000
-1	(RSP) SP300000	` SD130000	/ SP120000	\ SM070000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE170000	# SM010000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	[SM060000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	} SM140000	ï LI170000	\$ SC030000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	é LE110000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	§ SM240000	☒ SC010000	ö LO170000	:	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	Å LA280000	, SP080000	Ä LA180000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ö LO180000	ð LD630000	æ LA510000	Ð LD620000	¬ SM150000	¡ SM650000	~ SD190000	@ SM050000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

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Italian

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	[SM060000	μ SM170000	¢ SC040000	à LA130000	è LE130000	ç LC410000	0 ND100000
-1	(RSP) SP300000	] SM080000	/ SP120000	É LE120000	a LA010000	j LJ010000	ì LI130000	# SM010000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	{ SM110000	} SM140000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	@ SM050000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	\ SM070000	~ SD190000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	ù LU130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	° SM190000	é LE110000	ò LO130000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	£ SC020000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	§ SM240000	ð LD630000	æ LA510000	Ð LD620000	¬ SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	¡ SM650000	` SD130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	✕ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

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Japanese English

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	{ SM110000	}	\$ SC030000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	— SM150000	[SM060000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	\ SM070000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	£ SC020000	! SP020000	¡ SM650000	: SP130000	« SP170000	ª SM210000	ï SP030000	^ SD150000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	¥ SC050000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	] SM080000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	~ SD190000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	 SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	∩ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

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Portuguese

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	ã LA190000	' SD110000	Ç LC420000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ç LC410000	£ SC020000	À LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	{ SM110000	î LI150000	# SM010000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	~ SD190000	ì LI130000	\ SM070000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	ì LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	]	õ LO190000	:	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	. SP110000	\$ SC030000	, SP080000	Ã LA200000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Õ LO200000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	}	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	✕ SC010000	® SM530000	× SA070000	¡ SM650000	ÿ LY170000	@ SM050000	(EO)

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Spanish/Spanish Speaking

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	¨ SD170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ı SM650000	ß LS610000	# SM010000	` SD130000	ı LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	]	ñ LN190000	:	« SP170000	ª SM210000	ı SP030000	^ SD150000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	Ñ LN200000	» SP180000	º SM200000	¿ SP160000	! SP020000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	– SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	~ SD190000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	Ɔ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00284

English (UK)/Ireland

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	— SM150000	[SM060000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	\$ SC030000	! SP020000	¡ SM650000	: SP130000	« SP170000	ª SM210000	ï SP030000	^ SD150000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	. SP110000	£ SC020000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	] SM080000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	~ SD190000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	✕ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00285

Japanese Katakana

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	[SM060000	] SM080000	ソ JS500000	~ SD190000	^ SD150000	{ SM110000	}	\$ SC030000	0 ND100000
-1	。 JQ700000	エ JE010000	/ SP120000	i LI010000	ア JA000000	タ JT100000	- SM150000	¢ SC040000	A LA020000	J LJ020000		1 ND010000
-2	「 JQ710000	オ JO010000	a LA010000	j LI010000	イ JI000000	チ JT200000	へ JH400000	\ SM070000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	」 JQ720000	ヤ JY110000	b LB010000	k LK010000	ウ JU000000	ツ JT300000	ホ JH500000	t LT010000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	、 JQ730000	ユ JY310000	c LC010000	l LL010000	エ JE000000	テ JT400000	マ JM100000	u LU010000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	・ JQ740000	ヨ JY510000	d LD010000	m LM010000	オ JO000000	ト JT500000	ミ JM200000	v LV010000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ヲ JW500000	ツ JT310000	e LE010000	n LN010000	カ JK100000	ナ JN100000	ム JM300000	w LW010000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	ア JA010000		f LF010000	o LO010000	キ JK200000	ニ JN200000	メ JM400000	x LX010000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	イ JI010000	一 JX700000	g LG010000	p LP010000	ク JK300000	ヌ JN300000	モ JM500000	y LY010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ウ JU010000		h LH010000	` SD130000	ケ JK400000	ネ JN400000	ヤ JY100000	z LZ010000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	£ SC020000	! SP020000		: SP130000	コ JK500000	ノ JN500000	ユ JY300000	レ JR400000				
-B	・ SP110000	¥ SC050000	, SP080000	# SM010000	q LQ010000	r LR010000	s LS010000	ロ JR500000				
-C	< SA030000	* SM040000	% SM020000	@ SM050000	サ JS100000		ヨ JY500000	ワ JW100000				
-D	(SP060000	) SP070000	— SP090000	’ SP050000	シ JS200000	ハ JH100000	ラ JR100000	ン JN000000				
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ス JS300000	ヒ JH200000	リ JR200000	・ JX710000				
-F	| SM130000	⌋ SM660000	? SP150000	" SP040000	セ JS400000	フ JH300000	ル JR300000	。 JX720000				(EO)

Code Page 00290

French/French Azerty

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	[SM060000	` SD130000	¢ SC040000	é LE110000	è LE130000	ç LC410000	0 ND100000
-1	(RSP) SP300000	{ SM110000	/ SP120000	É LE120000	a LA010000	j LJ010000	¨ SD170000	# SM010000	À LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	@ SM050000	} SM140000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	] SM080000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	\ SM070000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	μ SM170000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	° SM190000	§ SM240000	ù LU130000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	£ SC020000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	à LA130000	ð LD630000	æ LA510000	Ð LD620000	¬ SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	~ SD190000	ò LO130000	¡ SM650000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	∩ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

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Arabic

HEX DIGITS												
1ST →	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓												
-0	(SP) SP010000	& SM030000	- SP100000	ح AH450003	شر AS230000	ظ AZ450000	غ AG310003	ك AK010003	؛ SP140007	؟ SP150007	× SA070000	0 ND100000
-1	(RSP) SP300000	أ AA310002	/ SP120000	خ AH470000	a LA010000	j LJ010000	÷ SA060000	ل AL010000	A LA020000	J LJ020000	(NSP) SP310000	1 ND010000
-2	و AX100000	ؤ AW310000	ة AT020000	ذ AH470003	b LB010000	k LK010000	s LS010000	ي AL220000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ـ AX100004		ت AT010000	د AD010000	c LC010000	l LL010000	t LT010000	ي AL220003	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ـ SM860000		ت AT010003	ذ AD470000	d LD010000	m LM010000	u LU010000	ي AL320000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	ع SM870000	ء AY310000	ث AT470000	ر AR010000	e LE010000	n LN010000	v LV010000	لأ AL320003	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ء AX300000	ا AA010000	ث AT470003	ز AZ010000	f LF010000	o LO010000	w LW010000		F LF020000	O LO020000	W LW020000	6 ND060000
-7	آ AA210000	ا AA010002	ج AG230000	س AS010000	g LG010000	p LP010000	x LX010000		G LG020000	P LP020000	X LX020000	7 ND070000
-8	آ AA210002	ب AB010000	ح AG230003	س AS010003	h LH010000	q LQ010000	y LY010000	لا AL020000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	أ AA310000	ب AB010003	ح AH450000	، SP080007	i LI010000	r LR010000	z LZ010000	لا AL020003	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	ا SM650000	: SP130000	ش AS230003	ع AC470000	غ AG310004	ل AL010003	(SHY) SP320000	ى AA020000	ا ND010001	
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	ص AS450000	ع AC470002	ف AF010000	م AM010000	ه AH010003	ى AA020002	٢ ND020001	٦ ND060001
-C	< SA030000	* SM040007	% SM020007	@ SM050000	ص AS450003	ع AC470003	ف AF010003	م AM010003		ي AY010000		٧ ND070001
-D	(SP060000	) SP070000	— SP090000	، SP050000	ض AD450000	ع AC470004	ق AQ010000	ن AN010000	ف AH010004	ي AY010002	٣ ND030001	٨ ND080001
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ض AD450003	غ AG310000	ق AQ010003	ن AN010003		ي AY010003	٤ ND040001	٩ ND090001
-F	| SM130000	⌋ SM660000	? SP150000	" SP040000	ط AT450000	غ AG310002	ك AK010000	ه AH010000	و AW010000	• ND100001	٥ ND050001	(EO)

Code Page 00420

Greek (Old)

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000		Ä LA180000	Ö LO180000	Ü LU180000		Š SD410000	’ SD110000	° SM190000	0 ND100000
-1	A GA020000	K GK020000	/ SP120000	‘A GA120000	a LA010000	j LJ010000	“ SD170000	ά GA110000	A LA020000	J LJ020000		1 ND010000
-2	B GB020000	Λ GL020000	T GT020000	‘E GE120000	b LB010000	k LK010000	s LS010000	έ GE110000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	Γ GG020000	M GM020000	Y GU020000	‘H GE720000	c LC010000	l LL010000	t LT010000	ή GE710000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	Δ GD020000	N GN020000	Φ GF020000	(RSP) SP300000	d LD010000	m LM010000	u LU010000	ï GI170000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	E GE020000	Ξ GX020000	X GH020000	‘I GI120000	e LE010000	n LN010000	v LV010000	ί GI110000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	Z GZ020000	O GO020000	Ψ GP620000	‘O GO120000	f LF010000	o LO010000	w LW010000	ό GO110000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	H GE320000	Π GP020000	Ω GO320000	‘Y GU120000	g LG010000	p LP010000	x LX010000	ύ GU110000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	Θ GT620000	P GR020000		‘Ω GO720000	h LH010000	q LQ010000	y LY010000	ÿ GU170000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	I GI020000	Σ GS020000		` SD130000	i LI010000	r LR010000	z LZ010000	ώ GO710000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	α GA010000	η GE310000	v GN010000	ς GS610000	(SHY) SP320000	± SA020000	½ NF010000	ÿ LY170000
-B	. SP110000	\$ SC030000	, SP080000	£ SC020000	β GB010000	Ɔ GT610000	ξ GX010000	τ GT010000	ω GO310000	é LE110000	ö LO170000	ç LC410000
-C	< SA030000	* SM040000	% SM020000	§ SM240000	γ GG010000	ι GI010000	ο GO010000	υ GU010000	â LA150000	è LE130000	ô LO150000	Ç LC420000
-D	(SP060000	) SP070000	— SP090000	’ SP050000	δ GD010000	κ GK010000	π GP010000	φ GF010000	à LA130000	ë LE170000	û LU150000	
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ε GE010000	λ GL010000	ρ GR010000	χ GH010000	ä LA170000	î LI150000	ù LU130000	
-F	! SP020000	^ SD150000	? SP150000	" SP040000	ζ GZ010000	μ GM010000	σ GS010000	ψ GP610000	ê LE150000	ï LI170000	ü LU170000	(EO)

Code Page 00423

Hebrew Bulletin

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000			° SM190000	μ SM170000	^ SD150000	{ SM110000	}	\ SM070000	0 ND100000
-1	א HX330000	י HY010000	/ SP120000	ת HT010000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	ב HB010000	ך HK610000	ע HX350000		b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ג HG010000	כ HK010000	ך HP610000		c LC010000	l LL010000	t LT010000	● SM570000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ד HD010000	ל HL010000	פ HP010000	(RSP) SP300000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	ה HH010000	ם HM610000	ץ HS610000		e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ו HW010000	מ HM010000	צ HS450000		f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	ז HZ010000	ן HN610000	ק HQ010000		g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ח HH450000	נ HN010000	ך HR010000	= SM100000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ט HT450000	ס HS010000	ש HS210000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	! SM650000	: SP130000	« SP170000			[SM060000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000			] SM080000				
-C	< SA030000	* SM040000	% SM020000	@ SM050000				- SM150000				
-D	(SP060000	) SP070000	— SP090000	‘ SP050000		’ SD410000		.. SD170000				
-E	+ SA010000	; SP140000	> SA050000	= SA040000				’ SD110000				
-F	 SM130000	⌋ SM660000	? SP150000	" SP040000	± SA020000	⊗ SC010000	® SM530000	× SA070000				(EO)

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International 5/Swiss/Belgian

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	]	¡ SM650000	:	« SP170000	ª SM210000	ï SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	¬ SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	ϝ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 00500

Greek/Latin (ISO 8859-7) + euro

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000			(RSP) SP300000	° SM190000	í GI730000	Π GP020000	ύ GU730000	π GP010000
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000			‘ SP190000	± SA020000	Α GA020000	Ρ GR020000	α GA010000	ρ GR010000
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000			, SP200000	² ND021000	Β GB020000		β GB010000	ς GS610000
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000			£ SC020000	³ ND031000	Γ GG020000	Σ GS020000	γ GG010000	σ GS010000
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000			€ SC200000	' SD110000	Δ GD020000	Τ GT020000	δ GD010000	τ GT010000
-5			% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000				’ SD730000	Ε GE020000	Υ GU020000	ε GE010000	υ GU010000
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000			| SM650000	Α GA120000	Z GZ020000	Φ GF020000	ζ GZ010000	φ GF010000
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000			§ SM240000	· SD630000	H GE320000	X GH020000	η GE310000	χ GH010000
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000			" SD170000	Έ GE120000	Θ GT620000	Ψ GP620000	θ GT610000	ψ GP610000
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000			© SM520000	Ή GE720000	Ι GI020000	Ω GO320000	ι GI010000	ω GO310000
-A			* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000				Ί GI120000	K GK020000	Ϊ GI180000	κ GK010000	ϊ GI170000
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000			« SP170000	» SP180000	Λ GL020000	Ÿ GU180000	λ GL010000	ÿ GU170000
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000			¬ SM660000	Ό GO120000	M GM020000	ά GA110000	μ GM010000	ό GO110000
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000			(SHT) SP320000	½ NF010000	N GN020000	έ GE110000	ν GN010000	ύ GU110000
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000				Υ GU120000	Ξ GX020000	ή GE710000	ξ GX010000	ώ GO710000
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000				— SM120000	Ω GO720000	O GO020000	ί GI110000	ο GO010000	

Code Page 00813

Korean

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	[SM060000	] SM080000		- SM150000	^ SD150000	{ SM110000	} SM140000	₩ SC140000	0 ND100000
-1			/ SP120000		a LA010000	j LJ010000	~ SD190000		A LA020000	J LJ020000		1 ND010000
-2	SP490000	ㄸ OD100000	ㄷ OL300000	ㅈ OJ000000	b LB010000	k LK010000	s LS010000	\ SM070000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ㄱ OG000000	ㄲ OL000000	ㅋ OM000000	ㅊ OJ100000	c LC010000	l LL010000	t LT010000		C LC020000	L LL020000	T LT020000	3 ND030000
-4	ㅌ OG100000	ㄴ OL200000	ㅍ OB000000	ㅊ OC200000	d LD010000	m LM010000	u LU010000		D LD020000	M LM020000	U LU020000	4 ND040000
-5	ㅍ OG200000	ㅇ OL400000	ㅈ OB100000	ㅊ OK000000	e LE010000	n LN010000	v LV010000		E LE020000	N LN020000	V LV020000	5 ND050000
-6	ㄴ ON000000	ㅇ OL100000	ㅈ OB200000	ㅊ OT000000	f LF010000	o LO010000	w LW010000		F LF020000	O LO020000	W LW020000	6 ND060000
-7	ㅍ ON150000	ㄴ OL600000	ㅈ OS000000	ㅊ OP000000	g LG010000	p LP010000	x LX010000		G LG020000	P LP020000	X LX020000	7 ND070000
-8	ㅍ ON100000	ㅈ OL700000	ㅈ OS100000	ㅊ OH000000	h LH010000	q LQ010000	y LY010000		H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ㅍ OD000000	ㅈ OL500000	ㅈ ON200000	ㅊ SD130000	i LI010000	r LR010000	z LZ010000		I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	! SM650000	: SP130000	ㅈ OA000000	ㅈ OY400000	ㅈ OY500000	ㅈ OE300000				
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	ㅈ OA200000	ㅈ OY300000	ㅈ OU000000	ㅈ OE400000				
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ㅈ OY200000	ㅈ OO000000	ㅈ OU300000	ㅈ OI000000				
-D	(SP060000	) SP070000	ㅈ SP090000	ㅈ SP050000	ㅈ OY250000	ㅈ OO100000	ㅈ OU200000					
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ㅈ OE200000	ㅈ OO200000	ㅈ OU400000					
-F	 SM130000	ㅈ SM660000	? SP150000	" SP040000	ㅈ OE000000	ㅈ OO300000	ㅈ OY600000					(EO)

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Thai

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-	
-0	(SP) SP010000	& SM030000	- SP100000	฿ SC130000	◎ BQ400000	๗ BQ500000	๘ BQ600000	○ ND100002	{ SM110000	}	\	0 ND100000	
-1	(RSP) SP300000	' BZ100300	/ SP120000	๑ BE400000	a LA010000	j LJ010000	~ SD190000	๑ ND010002	A LA020000	J LJ020000	๗ BZ300300	1 ND010000	
-2	ก BK100000	จ BC100000	ฉ BT100000	๓ BT600000	b LB010000	k LK010000	s LS010000	๒ ND020002	B LB020000	K LK020000	S LS020000	2 ND020000	
-3	ข BK200000	ฉ BX100000	๓ BT200000	๓ BT700000	c LC010000	l LL010000	t LT010000	๓ ND030002	C LC020000	L LL020000	T LT020000	3 ND030000	
-4	๒ BK300000	๒ BS100000	๓ BT300000	๓ BT800000	d LD010000	m LM010000	u LU010000	๔ ND040002	D LD020000	M LM020000	U LU020000	4 ND040000	
-5	ค BK400000	๒ BX200000	๓ BT400000	๓ BN300000	e LE010000	n LN010000	v LV010000	๕ ND050002	E LE020000	N LN020000	V LV020000	5 ND050000	
-6	ค BK500000	๓ BX300000	๓ BN200000	๓ BB100000	f LF010000	o LO010000	w LW010000	๖ ND060002	F LF020000	O LO020000	W LW020000	6 ND060000	
-7	๒ BK600000	๓ BY100000	๓ BD200000	๓ BP100000	g LG010000	p LP010000	x LX010000	๗ ND070002	G LG020000	P LP020000	X LX020000	7 ND070000	
-8	๓ BN100000	๓ BD100000	๓ BT500000	๓ BP200000	h LH010000	q LQ010000	y LY010000	๘ ND080002	H LH020000	Q LQ020000	Y LY020000	8 ND080000	
-9	[SM060000	] SM080000	^ SD150000	` SD130000	i LI010000	r LR010000	z LZ010000	๙ ND090002	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	๘ SC040000	! SP020000	! SM050000	: SP130000	๗ BF100000	๗ BR100000	๒ BS300000	๒ BQ200000	๒ BZ200300	• BQ300000	๓ BA700000	+	BZ400000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	๗ BP300000	๓ BR200000	๓ BS400000	๒ BA200000	๒ BI200000	๓ BE200000	๓ BQ100000	๓ BZ500000	
-C	< SA030000	* SM040000	% SM020000	@ SM050000	๗ BF200000	๓ BL100000	๓ BH100000	๒ BA100000	๒ BU100000	๓ BE300000	๓ BE100000	๓ BN400000	
-D	(SP060000) SP070000	— SP090000	' SP050000	๓ BP400000	๓ BL200000	๓ BL300000	๓ BA300000	๒ BU200000	๓ BO200000	๓ BZ100000	+	BZ400300
-E	+ SA010000	; SP140000	> SA050000	= SA040000	๓ BM100000	๓ BW100000	๓ BO100000	๓ BA400000	๓ BU300000	๓ BA500000	๓ BZ200000	๓ BZ500300	
-F	 SM130000	๓ SM660000	? SP150000	" SP040000	๓ BY200000	๓ BS200000	๓ BH200000	๓ BI100000	๓ BU400000	๓ BA600000	๓ BZ300000	(EO)	

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Latin 2/ROECE

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	√ SD210000	˘ SD230000	° SM190000	ą LA430000	· SD290000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE100000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	Ą LA440000	À LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ę LE430000	Â LA160000	Ě LE440000	b LB010000	k LK010000	s LS010000	ż LZ290000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ě LE180000	c LC010000	l LL010000	t LT010000	Ť LT420000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ţ LT410000	û LU270000	" SD250000	Û LU280000	d LD010000	m LM010000	u LU010000	Ž LZ300000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ǎ LA230000	î LI150000	Ă LA240000	Î LI160000	f LF010000	o LO010000	w LW010000	ž LZ210000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	č LC210000	ř LL210000	Č LC220000	Ř LL220000	g LG010000	p LP010000	x LX010000	ž LZ110000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	í LL110000	Ç LC420000	Ĺ LL120000	h LH010000	q LQ010000	y LY010000	Ž LZ220000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ć LC110000	ß LS610000	Ć LC120000	` SD130000	i LI010000	r LR010000	z LZ010000	Ž LZ120000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	]	| SM130000	: SP130000	ś LS110000	ł LL610000	Ś LS120000	Ł LL620000	(SHY) SP320000	Ě LE220000	ď LD210000	Ď LD220000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	ň LN210000	ń LN110000	Ň LN220000	Ń LN120000	ô LO150000	ú LU250000	Ô LO160000	Ú LU260000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	đ LD610000	š LS210000	Đ LD620000	Š LS220000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	Ÿ SD410000	Ý LY120000	¨ SD170000	í LR110000	ř LT210000	Ř LR120000	Ť LT220000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ř LR210000	č SD430000	Ř LR220000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	ş LS410000	Ŧ SC010000	Ş LS420000	× SA070000	ő LO250000	ě LE210000	Ő LO260000	(EO)

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Icelandic

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	þ LT630000	æ LA510000	' SD110000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ö LO170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	Ð LD630000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Þ LT640000	Æ LA520000	! SM650000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ð LD620000	` SD130000	} SM140000	@ SM050000	- SM150000	~ SD190000	ü LU170000	^ SD150000	Û LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	{ SM110000	] SM080000	[SM060000	\ SM070000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	Ö LO180000	? SP150000	" SP040000	± SA020000	✕ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

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Greek New + euro

HEX DIGITS	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →												
2ND ↓												
-0	(SP) SP010000	& SM030000	- SP100000	.. SD170000	‘ SD730000	◦ SM190000	’ SD110000	£ SC020000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	A GA020000	K GK020000	/ SP120000	À GA120000	a LA010000	j LJ010000	~ SD190000	á GA110000	À LA020000	J LJ020000		1 ND010000
-2	B GB020000	Λ GL020000	T GT020000	Ê GE120000	b LB010000	k LK010000	s LS010000	é GE110000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	Γ GG020000	M GM020000	Υ GU020000	’H GE720000	c LC010000	l LL010000	t LT010000	ή GE710000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	Δ GD020000	N GN020000	Φ GF020000	(RSP) SP300000	d LD010000	m LM010000	u LU010000	ï GI170000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	E GE020000	Ξ GX020000	X GH020000	’I GI120000	e LE010000	n LN010000	v LV010000	í GI110000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	Z GZ020000	O GO020000	Ψ GP620000	’O GO120000	f LF010000	o LO010000	w LW010000	ó GO110000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	H GE320000	Π GP020000	Ω GO320000	’Y GU120000	g LG010000	p LP010000	x LX010000	ú GU110000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	Θ GT620000	P GR020000	İ GI180000	’Ω GO720000	h LH010000	q LQ010000	y LY010000	ü GU170000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	I GI020000	Σ GS020000	ÿ GU180000	` SD130000	i LI010000	r LR010000	z LZ010000	ó GO710000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	α GA010000	η GE310000	ν GN010000	ς GS610000	(SHY) SP320000	± SA020000	² ND021000	³ ND031000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	β GB010000	θ GT610000	ξ GX010000	τ GT010000	ω GO310000	½ NF010000	§ SM240000	© SM520000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	γ GG010000	ι GI010000	ο GO010000	υ GU010000	ί GI730000			€ SC200000
-D	(SP060000	) SP070000	_ SP090000	’ SP050000	δ GD010000	κ GK010000	π GP010000	φ GF010000	ύ GU730000	• SD630000		
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ε GE010000	λ GL010000	ρ GR010000	χ GH010000	‘ SP190000	’ SP200000	« SP170000	» SP180000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	ζ GZ010000	μ GM010000	σ GS010000	ψ GP610000	— SM120000	¡ SM650000	¬ SM660000	(EO) SC010000

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Cyrillic

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	Ъ KN120000	Ц KC010000	Й KJ110000	Я KA150000	Ь KX110000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	ЛЪ KL410000	/ SP120000	Ѡ KC120000	а LA010000	ј LJ010000	~ SD190000	Ы KY010000	А LA020000	Ј LJ020000	Ѳ SC010000	1 ND010000
-2	ђ KD610000	Њ KN110000	Ѓ KG120000	Ќ KK120000	б LB010000	к LK010000	ѕ LS010000	З KZ010000	В LB020000	К LK020000	Ѕ LS020000	2 ND020000
-3	ѓ KG110000	ћ KC110000	Ё KE180000	(SHY) SP320000	с LC010000	l LL010000	t LT010000	Ш KS210000	С LC020000	Л LL020000	Т LT020000	3 ND030000
-4	ё KE170000	ќ KK110000	Є KE160000	Ў KU240000	d LD010000	m LM010000	u LU010000	э KE130000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	є KE150000	ђ KU230000	Ѕ KZ160000	Џ KG220000	е LE010000	n LN010000	v LV010000	щ KS150000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	s KZ150000	ц KG210000	І KI120000	Ю KU150000	f LF010000	o LO010000	w LW010000	ч KC210000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	i KI110000	Ѣ KU220000	Ї KI180000	а KA010000	g LG010000	p LP010000	x LX010000	ъ KU210000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ï KI170000	№ SM000000	J KJ020000	Ѡ KB010000	h LH010000	q LQ010000	y LY010000	Ю KU160000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	j KJ010000	Ѣ KD620000	Љ KL420000	` SD130000	i LI010000	r LR010000	z LZ010000	А KA020000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	| SM130000	: SP130000	д KD010000	к KK010000	р KR010000	Б KB020000	X KH020000	Н KN020000	Т KT020000	З KZ020000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	е KE010000	л KL010000	с KS010000	Ц KC020000	И KI020000	О KO020000	У KU020000	Ш KS220000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ф KF010000	м KM010000	т KT010000	Д KD020000	Й KJ120000	П KP020000	Ж KZ220000	Э KE140000
-D	(SP060000	) SP070000	— SP090000	' SP050000	г KG010000	н KN010000	у KU010000	Е KE020000	К KK020000	Я KA160000	В KV020000	Щ KS160000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	х KH010000	о KO010000	ж KZ210000	Ф KF020000	Л KL020000	Р KR020000	Ь KX120000	Ч KC220000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	и KI010000	п KP010000	в KV010000	Г KG020000	М KM020000	С KS020000	Ы KY020000	(EO)

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Yugoslav (Old)

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	√ SD210000	˘ SD230000	° SD270000	ą LA430000	· SD290000	š LS210000	ć LC110000	Đ LD620000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	č LC210000	£ SC020000	A LA020000	J LJ020000	(NSP) SP310000	1 ND010000
-2	â LA150000	ę LE430000	Â LA160000	Ě LE440000	b LB010000	k LK010000	s LS010000	ž LZ290000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ě LE180000	c LC010000	l LL010000	t LT010000	Ť LT420000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	û LU270000	À LA140000	Û LU280000	d LD010000	m LM010000	u LU010000	Ž LZ300000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ǎ LA230000	î LI150000	Ǻ LA240000	Î LI160000	f LF010000	o LO010000	w LW010000	` SD130000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	" SD250000	ĭ LL210000	^ SD150000	Ľ LL220000	g LG010000	p LP010000	x LX010000	ž LZ110000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	í LL110000	Ç LC420000	Ľ LL120000	h LH010000	q LQ010000	y LY010000	@ SM050000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	Đ LD220000	ß LS610000	J SM080000	ž LZ210000	i LI010000	r LR010000	z LZ010000	Ž LZ120000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Š LS220000	Ć LC120000	đ LD610000	: SP130000	ś LS110000	ł LL610000	Ś LS120000	Ł LL620000	(SHY) SP320000	Ě LE220000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	ň LN210000	ń LN110000	Ň LN220000	Ň LN120000	ô LO150000	ú LU250000	Ô LO160000	Ú LU260000
-C	< SA030000	* SM040000	% SM020000	Ž LZ220000	ě LE210000	ď LD210000	Ą LA440000	[SM060000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	‚ SD410000	Ý LY120000	” SD170000	í LR110000	ť LT210000	Ř LR120000	Ť LT220000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ř LR210000	ć SD430000	Ř LR220000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	Č LC220000	? SP150000	" SP040000	š LS410000	Ŕ SC010000	Š LS420000	ţ LT410000	ő LO250000	ÿ LY170000	Ő LO260000	(EO)

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OCR-A

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000		Ø LO620000				{ SM110000	}	\ SM070000	0 ND100000
-1			/ SP120000		a LA010000	j LJ010000		£ SC020000	A LA020000	J LJ020000		1 ND010000
-2					b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3			Ä LA180000		c LC010000	l LL010000	t LT010000		C LC020000	L LL020000	T LT020000	3 ND030000
-4					d LD010000	m LM010000	u LU010000		D LD020000	M LM020000	U LU020000	4 ND040000
-5					e LE010000	n LN010000	v LV010000		E LE020000	N LN020000	V LV020000	5 ND050000
-6					f LF010000	o LO010000	w LW010000		F LF020000	O LO020000	W LW020000	6 ND060000
-7			Å LA280000	— SO150000	g LG010000	p LP010000	x LX010000		G LG020000	P LP020000	X LX020000	7 ND070000
-8					h LH010000	q LQ010000	y LY010000		H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9			Ñ LN200000		i LI010000	r LR010000	z LZ010000		I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000		:								
-B	. SP110000	\$ SC030000	, SP080000	# SM010000				| SO130000	¶ SO020000	ſ SO000000	ƣ SO010000	
-C	< SA030000	* SM040000	% SM020000	@ SM050000							Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000		' SP050000								
-E	+ SA010000	; SP140000	> SA050000	= SA040000		Æ LA520000						
-F	! SP020000		? SP150000	" SP040000				■ SO140000		^ SM090000		(EO)

Code Page 00892

OCR-B

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000				{ SM110000	}	\ SM070000	0 ND100000
-1			/ SP120000		a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000		1 ND010000
-2					b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000		Ä LA180000		c LC010000	l LL010000	t LT010000		C LC020000	L LL020000	T LT020000	3 ND030000
-4					d LD010000	m LM010000	u LU010000		D LD020000	M LM020000	U LU020000	4 ND040000
-5					e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6				— SD470000	f LF010000	o LO010000	w LW010000		F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000		Å LA280000	— SO150000	g LG010000	p LP010000	x LX010000		G LG020000	P LP020000	X LX020000	7 ND070000
-8					h LH010000	q LQ010000	y LY010000		H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9		ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000		I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000		: SP130000								
-B	. SP110000	\$ SC030000	, SP080000	# SM010000				| SO130000				
-C	< SA030000	* SM040000	% SM020000	@ SM050000		æ LA510000			ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000		đ SD410000		.. SD170000				
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ij LI510000	Æ LA520000		' SD110000				
-F	! SP020000	^ SD150000	? SP150000	" SP040000	IJ LI520000	□ SC010000		■ SO140000		Λ SM090000		(EO)

Code Page 00893

Latin 9 (ISO 8859) + euro

HEX DIGITS	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →												
2ND ↓												
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	ϕ SC040000	{ SM110000	} SM140000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	Æ LO520000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	æ LO510000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	ÿ LY180000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Ý LY120000	! SP020000	Š LS220000	: SP130000	« SP170000	² SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	¹ ND011000	² ND021000	³ ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	³ SM200000	¿ SP160000	š LS210000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	đ LD630000	æ LA510000	Ð LD640000	- SD310000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	_ SP090000	' SP050000	ý LY110000	ž LZ210000	[SM060000	] SM080000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Ɔ LT640000	Ž LZ220000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO) ND000000

Code Page 00924

Cyrillic Multilingual

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	Ъ KN120000	Ц KC010000	Й KJ110000	Я KA150000	Ь KX110000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	Љ KL410000	/ SP120000	Ѡ KC120000	а LA010000	ј LJ010000	~ SD190000	ы KY010000	А LA020000	Ј LJ020000	§ SM240000	1 ND010000
-2	ђ KD610000	њ KN110000	ѓ KG120000	ќ KK120000	б LB010000	к LK010000	ѕ LS010000	з KZ010000	В LB020000	К LK020000	Ѕ LS020000	2 ND020000
-3	ѓ KG110000	ћ KC110000	Ё KE180000	(SHY) SP320000	с LC010000	l LL010000	t LT010000	ш KS210000	С LC020000	Л LL020000	Т LT020000	3 ND030000
-4	ё KE170000	ќ KK110000	Є KE160000	Ў KU240000	d LD010000	m LM010000	u LU010000	э KE130000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	є KE150000	ђ KU230000	Ѕ KZ160000	Џ KG220000	е LE010000	п LN010000	в LV010000	щ KS150000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	s KZ150000	ц KG210000	І KI120000	ю KU150000	f LF010000	о LO010000	w LW010000	ч KC210000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	i KI110000	Ѣ KU220000	Ї KI180000	а KA010000	g LG010000	p LP010000	x LX010000	ъ KU210000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ï KI170000	N² SM000000	J KJ020000	б KB010000	h LH010000	q LQ010000	y LY010000	Ю KU160000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	j KJ010000	Ѥ KD620000	Љ KL420000	` SD130000	i LI010000	r LR010000	z LZ010000	А KA020000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	]	| SM130000	: SP130000	д KD010000	к KK010000	р KR010000	Б KB020000	X KH020000	Н KN020000	Т KT020000	З KZ020000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	е KE010000	л KL010000	с KS010000	Ц KC020000	И KI020000	О KO020000	У KU020000	Ш KS220000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ф KF010000	м KM010000	т KT010000	Д KD020000	Й KJ120000	П KP020000	Ж KZ220000	Э KE140000
-D	(SP060000	) SP070000	— SP090000	' SP050000	г KG010000	н KN010000	у KU010000	Е KE020000	К KK020000	Я KA160000	В KV020000	Щ KS160000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	х KH010000	о KO010000	ж KZ210000	Ф KF020000	Л KL020000	Р KR020000	Ь KX120000	Ч KC220000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	и KI010000	п KP010000	в KV010000	Г KG020000	М KM020000	С KS020000	Ы KY020000	(EO)

Code Page 01025

Latin-5 Turkey

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	ç LC410000	ğ LG230000	ü LU170000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ö LO170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	{ SM110000	ì LI130000	[SM060000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	ı LI610000	ı LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Ç LC420000	Ğ LG240000	Ş LS410000	:	« SP170000	ª SM210000	ı SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	İ LI300000	, SP080000	Ö LO180000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ş LS420000	}	æ LA510000	] SM080000	- SM150000	~ SD190000	\ SM070000	# SM010000	" SP040000
-D	(SP060000	) SP070000	— SP090000	' SP050000	` SD130000	´ SD410000	\$ SC030000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ı SM650000	Æ LA520000	@ SM050000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	Ü LU180000	± SA020000	ϝ SC010000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

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Farsi

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	چ AC210003	ژ AZ210000	ص AS450006	ظ AZ450002	غ AG310003	{ SM110000	}	\	0 ND100000
-1	(RSP) SP300000	ء AX300000	/	ح AH450000	a LA010000	j LJ010000	~ SD190000	خ AG310004	A LA020000	J LJ020000	؟ SP150007	1 ND010000
-2	، SP080007	آ AA310000	پ AP010003	ح AH450003	b LB010000	k LK010000	s LS010000	ف AF010000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	، AA070009	آ AA310002	ت AT010000	خ AH470000	c LC010000	l LL010000	t LT010000	ف AF010003	C LC020000	L LL020000	T LT020000	3 ND030000
-4	آ AA210000	آ AA310006	ت AT010003	خ AH470003	d LD010000	m LM010000	u LU010000	ق AQ010000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	آ AA210002	ؤ AW310000	ث AT470000	د AD010000	e LE010000	n LN010000	v LV010000	ق AQ010003	E LE020000	N LN020000	V LV020000	5 ND050000
-6	آ AA210006	ء AY320003	ث AT470003	ذ AD470000	f LF010000	o LO010000	w LW010000	ک AK010006	F LF020000	O LO020000	W LW020000	6 ND060000
-7	ا AA010000	ب AB010000	ج AG230000	ر AR010000	g LG010000	p LP010000	x LX010000	ک AK010003	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ا AA010002	ب AB010003	ج AG230003	ز AZ010000	h LH010000	q LQ010000	y LY010000	گ AG010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ا AA010006	پ AP010000	چ AC210000	، SD130000	i LI010000	r LR010000	z LZ010000	گ AG010003	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	ط SC160000	!	؛ SP140007	؛ SP130000	« SP170000	ص AS450003	ع AC470000	[SM060000	(SHY) SP320000	ه AH010003	— SM860000	۵ ND050004
-B	. SP110000	\$ SC030000	، SP080000	# SM010000	» SP180000	ض AD450006	ع AC470002	] SM080000	م AM010003	ف AH010004	ه ND100003	۶ ND060003
-C	< SA030000	* SM040007	% SM020007	@ SM050000	س AS010006	ض AD450003	ع AC470003	ل AL010000	ن AN010000	ه AH210000	ا ND010001	۷ ND070001
-D	(SP060000	) SP070000	— SP090000	' SP050000	س AS010003	ط AT450001	ع AC470004	ل AL010003	ن AN010003	ی AY020000	۲ ND020001	۸ ND080001
-E	+ SA010000	؛ SP140000	> SA050000	= SA040000	ش AS230006	ط AT450002	غ AG310000	م AM010000	و AW010000	ی AY020002	۳ ND030001	۹ ND090001
-F	| SM130000	⌋ SM660000	? SP150000	" SP040000	ش AS230003	ظ AZ450001	غ AG310002	×	ه AH010000	ی AY020003	۴ ND040003	(EO)

Code Page 01097

Baltic Multilingual

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	^ SD150000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	š LS210000	ę LE430000	Š LS220000	Ė LE440000	b LB010000	k LK010000	s LS010000	ī LI310000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	è LE290000	Ä LA180000	Ė LE300000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	ą LA430000	č LC210000	Ą LA440000	Č LC220000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	ì LI430000	ų LU430000	Į LI440000	Ų LU440000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ū LU310000	„ SP230000	Ū LU320000	Ī LI320000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	“ SP210000	Å LA280000	Ł LL420000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ē LE310000	ġ LG410000	Ē LE320000	Ġ LG420000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ž LZ210000	ß LS610000	Ž LZ220000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¡ SM650000	: SP130000	« SP170000	Ŕ LR420000	” SP220000	[SM060000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	ŗ LR410000	ž LZ110000	]	ō LO310000	ć LC110000	ō LO320000	Ć LC120000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ā LA310000	æ LA510000	Ā LA320000	Ž LZ120000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ž LZ290000	ķ LK410000	Ž LZ300000	Ķ LK420000	ņ LN410000	ļ LL610000	Ņ LN420000	Ļ LL620000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ń LN110000	Æ LA520000	Ń LN120000	ł LL410000	ó LO110000	ś LS110000	Ó LO120000	Ś LS120000
-F	| SM130000	⌋ SM660000	? SP150000	" SP040000	± SA020000	ϝ SC010000	® SM530000	× SA070000	õ LO190000	' SP200000	Õ LO200000	(EO)

Code Page 01112

Estonian

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	ä LA170000	å LA270000	É LE120000	0 ND100000
-1	(RSP) SP300000	` SD130000	/ SP120000	\ SM070000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE170000	# SM010000	Ë LE180000	c LC010000	l LL010000	t LT010000	· SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	[SM060000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	} SM140000	ï LI170000	\$ SC030000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	é LE110000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	§ SM240000	☒ SC010000	ö LO170000	: SP130000	« SP170000	ª SM210000	¡ SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	Å LA280000	, SP080000	Ä LA180000	» SP180000	º SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ö LO180000	š LS210000	æ LA510000	Š LS220000	– SM150000	¡ SM650000	~ SD190000	@ SM050000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	” SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	ž LZ210000	Æ LA520000	Ž LZ220000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01122

USA/Canada + euro

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	^ SD150000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	¢ SC040000	! SP020000	¡ SM650000	: SP130000	« SP170000	² SM210000	ı SP030000	[SM060000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	³ SM200000	¿ SP160000	] SM080000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO) ND000000

Code Page 01140

Austrian/German + euro

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	ä LA170000	ü LU170000	Ö LO180000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ß LS610000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE180000	[SM060000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI120000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	@ SM050000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	~ SD190000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Ä LA180000	Ü LU180000	ö LO170000	: SP130000	« SP170000	² SM210000	ı SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	³ SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	§ SM240000	ð LD630000	æ LA510000	Ð LD620000	¯ SM150000	¡ SM650000	}	\	\] SM080000
-D	(SP060000	) SP070000	— SP090000	‘ SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	’ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01141

Danish/Norwegian + euro

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	| SM650000	@ SM050000	° SM190000	μ SM170000	¢ SC040000	æ LA510000	å LA270000	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI120000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	}	ï LI170000	\$ SC030000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	# SM010000	€ SC200000	ø LO610000	: SP130000	« SP170000	² SM210000	ı SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	Å LA280000	, SP080000	Æ LA520000	» SP180000	³ SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ø LO620000	ð LD630000	{ SM110000	Ð LD620000	¬ SM150000	ö LO170000	~ SD190000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	[SM060000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01142

Finnish/Swedish + euro

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	ä LA170000	å LA270000	É LE120000	0 ND100000
-1	(RSP) SP300000	` SD130000	/ SP120000	\ SM070000	a LA010000	j LJ010000	ü LU170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	{ SM110000	ë LE180000	# SM010000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE140000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI120000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	[SM060000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	}	ï LI170000	\$ SC030000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	é LE110000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	§ SM240000	€ SC200000	ö LO170000	: SP130000	« SP170000	² SM210000	ı SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	Å LA280000	, SP080000	Ä LA180000	» SP180000	³ SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ö LO180000	ø LD630000	æ LA510000	Ð LD620000	¯ SM150000	¡ SM650000	~ SD190000	@ SM050000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	‘ SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	’ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000] SM080000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

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HEX DIGITS	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →												
2ND ↓												
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	[SM060000	μ SM170000	¢ SC040000	à LA130000	è LE130000	ç LC410000	0 ND100000
-1	(RSP) SP300000] SM080000	/ SP120000	É LE120000	a LA010000	j LJ010000	ì LI130000	# SM010000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	{ SM110000	} SM140000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	@ SM050000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	\ SM070000	~ SD190000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	Ù LU130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	° SM190000	é LE110000	ò LO130000	: SP130000	« SP170000	ª SM210000	ì SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	£ SC020000	» SP180000	º SM200000	¿ SP160000	 SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	§ SM240000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000) SP070000	— SP090000	' SP050000	ý LY110000	· SD410000	Ý LY120000	¨ SD170000	¡ SM650000	` SD130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO) ND000000

Spanish/Spanish Speaking + euro

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	“ SD170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI120000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ı SM650000	ß LS610000	# SM010000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	ñ LN190000	: SP130000	« SP170000	² SM210000	ı SP030000	^ SD150000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	. SP110000	\$ SC030000	, SP080000	Ñ LN200000	» SP180000	³ SM200000	¿ SP160000	! SP020000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	‘ SP050000	ý LY110000	¸ SD410000	Ý LY120000	~ SD190000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	’ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	| SM130000	¬ SM660000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO) ND000000

Code Page 01145

English/UK + euro

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	ø (SP) SP010000	& (SM) SM030000	- (SP) SP100000	ø (LO) LO610000	Ø (LO) LO620000	° (SM) SM190000	μ (SM) SM170000	¢ (SC) SC040000	{ (SM) SM110000	}	\ (SM) SM070000	0 (ND) ND100000
-1	é (RSP) SP300000	é (LE) LE110000	/ (SP) SP120000	É (LE) LE120000	a (LA) LA010000	j (LJ) LJ010000	ˉ (SM) SM150000	[(SM) SM060000	A (LA) LA020000	J (LJ) LJ020000	÷ (SA) SA060000	1 (ND) ND010000
-2	â (LA) LA150000	ê (LE) LE150000	Â (LA) LA160000	Ê (LE) LE160000	b (LB) LB010000	k (LK) LK010000	s (LS) LS010000	¥ (SC) SC050000	B (LB) LB020000	K (LK) LK020000	S (LS) LS020000	2 (ND) ND020000
-3	ä (LA) LA170000	ë (LE) LE170000	Ä (LA) LA180000	Ë (LE) LE180000	c (LC) LC010000	l (LL) LL010000	t (LT) LT010000	• (SD) SD630000	C (LC) LC020000	L (LL) LL020000	T (LT) LT020000	3 (ND) ND030000
-4	à (LA) LA130000	è (LE) LE130000	À (LA) LA140000	È (LE) LE140000	d (LD) LD010000	m (LM) LM010000	u (LU) LU010000	© (SM) SM520000	D (LD) LD020000	M (LM) LM020000	U (LU) LU020000	4 (ND) ND040000
-5	á (LA) LA110000	í (LI) LI100000	Á (LA) LA120000	Í (LI) LI120000	e (LE) LE010000	n (LN) LN010000	v (LV) LV010000	§ (SM) SM240000	E (LE) LE020000	N (LN) LN020000	V (LV) LV020000	5 (ND) ND050000
-6	ã (LA) LA190000	î (LI) LI150000	Ã (LA) LA200000	Î (LI) LI160000	f (LF) LF010000	o (LO) LO010000	w (LW) LW010000	¶ (SM) SM250000	F (LF) LF020000	O (LO) LO020000	W (LW) LW020000	6 (ND) ND060000
-7	å (LA) LA270000	ï (LI) LI170000	Å (LA) LA280000	Ï (LI) LI180000	g (LG) LG010000	p (LP) LP010000	x (LX) LX010000	¼ (NF) NF040000	G (LG) LG020000	P (LP) LP020000	X (LX) LX020000	7 (ND) ND070000
-8	ç (LC) LC410000	ì (LI) LI130000	Ç (LC) LC420000	Ì (LI) LI140000	h (LH) LH010000	q (LQ) LQ010000	y (LY) LY010000	½ (NF) NF010000	H (LH) LH020000	Q (LQ) LQ020000	Y (LY) LY020000	8 (ND) ND080000
-9	ñ (LN) LN190000	ß (LS) LS610000	Ñ (LN) LN200000	` (SD) SD130000	i (LI) LI010000	r (LR) LR010000	z (LZ) LZ010000	¾ (NF) NF050000	I (LI) LI020000	R (LR) LR020000	Z (LZ) LZ020000	9 (ND) ND090000
-A	\$ (SC) SC030000	! (SP) SP020000	¡ (SM) SM650000	: (SP) SP130000	« (SP) SP170000	² (SM) SM210000	ı (SP) SP030000	^ (SD) SD150000	(SHY) (SP) SP320000	1 (ND) ND011000	2 (ND) ND021000	3 (ND) ND031000
-B	. (SP) SP110000	£ (SC) SC020000	, (SP) SP080000	# (SM) SM010000	» (SP) SP180000	º (SM) SM200000	¿ (SP) SP160000	] (SM) SM080000	ô (LO) LO150000	û (LU) LU150000	Ô (LO) LO160000	Û (LU) LU160000
-C	< (SA) SA030000	* (SM) SM040000	% (SM) SM020000	@ (SM) SM050000	ð (LD) LD630000	æ (LA) LA510000	Ð (LD) LD620000	~ (SD) SD190000	ö (LO) LO170000	ü (LU) LU170000	Ö (LO) LO180000	Ü (LU) LU180000
-D	((SP) SP060000	) (SP) SP070000	— (SP) SP090000	' (SP) SP050000	ý (LY) LY110000	¸ (SD) SD410000	Ý (LY) LY120000	¨ (SD) SD170000	ò (LO) LO130000	ù (LU) LU130000	Ò (LO) LO140000	Ù (LU) LU140000
-E	+ (SA) SA010000	; (SP) SP140000	> (SA) SA050000	= (SA) SA040000	þ (LT) LT630000	Æ (LA) LA520000	Þ (LT) LT640000	' (SD) SD110000	ó (LO) LO110000	ú (LU) LU110000	Ó (LO) LO120000	Ú (LU) LU120000
-F	| (SM) SM130000	⌋ (SM) SM660000	? (SP) SP150000	" (SP) SP040000	± (SA) SA020000	€ (SC) SC200000	® (SM) SM530000	× (SA) SA070000	õ (LO) LO190000	ÿ (LY) LY170000	Õ (LO) LO200000	Ⓔ (EO)

Code Page 01146

French + euro

HEX DIGITS	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →												
2ND ↓												
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	[SM060000	` SD130000	¢ SC040000	é LE110000	è LE130000	ç LC410000	0 ND100000
-1	(RSP) SP300000	{ SM110000	/ SP120000	É LE120000	a LA010000	j LJ010000	¨ SD170000	# SM010000	À LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	@ SM050000	}	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI110000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	] SM080000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	\ SM070000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	μ SM170000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	° SM190000	§ SM240000	ù LU130000	: SP130000	« SP170000	² SM210000	¡ SP030000	¬ SM660000	(SHV) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	· SP110000	\$ SC030000	, SP080000	£ SC020000	» SP180000	³ SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	à LA130000	đ LD630000	æ LA510000	Ð LD620000	- SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	‘ SP050000	ý LY110000	¸ SD410000	Ý LY120000	~ SD190000	ò LO130000	¡ SM650000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	’ SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO)

Code Page 01147

International 5/Belgian New + euro

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	{ SM110000	}	\ SM070000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	~ SD190000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE170000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI120000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	` SD130000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	[SM060000	] SM080000	¡ SM650000	: SP130000	« SP170000	² SM210000	ı SP030000	¬ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	. SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	³ SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	@ SM050000	ð LD630000	æ LA510000	Ð LD620000	¬ SM150000	ö LO170000	ü LU170000	Ö LO180000	Ü LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	¸ SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	þ LT630000	Æ LA520000	Þ LT640000	' SD110000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	^ SD150000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO) ND000000

Code Page 01148

Icelandic + euro

HEX DIGITS 1ST → 2ND ↓	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	(SP) SP010000	& SM030000	- SP100000	ø LO610000	Ø LO620000	° SM190000	μ SM170000	¢ SC040000	þ LT630000	æ LA510000	' SD110000	0 ND100000
-1	(RSP) SP300000	é LE110000	/ SP120000	É LE120000	a LA010000	j LJ010000	ö LO170000	£ SC020000	A LA020000	J LJ020000	÷ SA060000	1 ND010000
-2	â LA150000	ê LE150000	Â LA160000	Ê LE160000	b LB010000	k LK010000	s LS010000	¥ SC050000	B LB020000	K LK020000	S LS020000	2 ND020000
-3	ä LA170000	ë LE180000	Ä LA180000	Ë LE180000	c LC010000	l LL010000	t LT010000	• SD630000	C LC020000	L LL020000	T LT020000	3 ND030000
-4	à LA130000	è LE130000	À LA140000	È LE140000	d LD010000	m LM010000	u LU010000	© SM520000	D LD020000	M LM020000	U LU020000	4 ND040000
-5	á LA110000	í LI120000	Á LA120000	Í LI120000	e LE010000	n LN010000	v LV010000	§ SM240000	E LE020000	N LN020000	V LV020000	5 ND050000
-6	ã LA190000	î LI150000	Ã LA200000	Î LI160000	f LF010000	o LO010000	w LW010000	¶ SM250000	F LF020000	O LO020000	W LW020000	6 ND060000
-7	å LA270000	ï LI170000	Å LA280000	Ï LI180000	g LG010000	p LP010000	x LX010000	¼ NF040000	G LG020000	P LP020000	X LX020000	7 ND070000
-8	ç LC410000	ì LI130000	Ç LC420000	Ì LI140000	h LH010000	q LQ010000	y LY010000	½ NF010000	H LH020000	Q LQ020000	Y LY020000	8 ND080000
-9	ñ LN190000	ß LS610000	Ñ LN200000	Ð LD630000	i LI010000	r LR010000	z LZ010000	¾ NF050000	I LI020000	R LR020000	Z LZ020000	9 ND090000
-A	Þ LT640000	Æ LA520000	ǀ SM650000	⋮ SP130000	« SP170000	⌘ SM210000	ı SP030000	⌞ SM660000	(SHY) SP320000	1 ND011000	2 ND021000	3 ND031000
-B	• SP110000	\$ SC030000	, SP080000	# SM010000	» SP180000	⌚ SM200000	¿ SP160000	| SM130000	ô LO150000	û LU150000	Ô LO160000	Û LU160000
-C	< SA030000	* SM040000	% SM020000	Ð LD620000	` SD130000	} SM140000	@ SM050000	- SM150000	~ SD190000	ü LU170000	^ SD150000	Û LU180000
-D	(SP060000	) SP070000	— SP090000	' SP050000	ý LY110000	• SD410000	Ý LY120000	¨ SD170000	ò LO130000	ù LU130000	Ò LO140000	Ù LU140000
-E	+ SA010000	; SP140000	> SA050000	= SA040000	{ SM110000	] SM080000	[SM060000	\ SM070000	ó LO110000	ú LU110000	Ó LO120000	Ú LU120000
-F	! SP020000	Ö LO180000	? SP150000	" SP040000	± SA020000	€ SC200000	® SM530000	× SA070000	õ LO190000	ÿ LY170000	Õ LO200000	(EO) ND000000

Code Page 01149

















































ASCII Code Pages

The table below lists the ASCII code pages used by the 4247 Printer, and also provides page references so you can determine what code page contains the characters you want to use.

Code Page	Character Set Name	Page
437	USA (Personal Computer) A-54	278
737	Greek (MS DOS)	279
813	Greek/Latin (ISO 8859-7)	280
819	Latin 1 (ISO 8859-1)	281
850	PC Multilingual	282
851	Old Greek	283
852	Latin 2/ROECE	284
853	Latin 3 (PC)	285
855	Cyrillic (PC)	286
857	Latin 5-Turkey + euro	287
858	PC Multilingual + euro	288
860	Portuguese	289
861	Icelandic	290
862	Hebrew	291
863	Canadian French	292
864	Arabic	293
865	Danish/Norwegian	294
866	PC Data, Cyrillic, Russian	295
869	Greek New + euro	296
874	Thai	297
876	OCR-A	298
877	OCR-B	299
912	Latin 2 (ISO 8859-2)	300
913	Latin 3 (ISO 8859-3)	301
914	Latin 4 (ISO 8859-4)	302
915	Cyrillic (ISO 8859-5)	303
916	Latin 8 (ISO 8859-8)	304
920	Latin 5 (ISO 8859-9)	305
921	Baltic Multilingual	306
922	Estonian	307
923	Latin 9 (ISO 8859-15) + euro	308
1006	Urdu	309
1046	Arabic Extended	310
1089	Latin 6 (ISO 8859-6)	311
1098	Farsi (Personal Computer)	312
1116	Estonian (Personal Computer)	313

Code Page	Character Set Name	Page
1117	Latvian (Personal Computer)	314
1118	Lithuanian (Personal Computer)	315
1250	Central Europe Latin 2	316
1251	Cyrillic Windows + euro	317
	Extended Graphics Character Table	318
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	Epson Extended Character Variables	320

USA (Personal Computer) A-54

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		► SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	á LA110000	 SF140000	 SF020000	 SF460000	α GA010000	≡ SA480000
-1	☺ SS000000	◄ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	æ LA510000	í LI110000	 SF150000	 SF070000	 SF470000	β LS610000	± SA020000
-2	☹ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Æ LA520000	ó LO110000	 SF160000	 SF060000	 SF480000	Γ GG020000	≥ SA530000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	 SF110000	 SF080000	 SF490000	π GP010000	≤ SA520000
-4	♦ SS030000	¶ SM250000	\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	ñ LN190000	 SF090000	 SF100000	 SF500000	Σ GS020000	ƒ SS260000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	ò LO130000	Ñ LN200000	 SF190000	 SF050000	 SF510000	σ GS010000	J SS270000
-6	♠ SS050000	■ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	å LA270000	û LU150000	æ SM210000	 SF200000	 SF360000	 SF520000	μ GM010000	÷ SA060000
-7	• SM570000	↕ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	ù LU130000	º SM200000	 SF210000	 SF370000	 SF530000	τ GT010000	≈ SA700000
-8	■ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	ÿ LY170000	¿ SP160000	 SF220000	 SF380000	 SF540000	Φ GF020000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	┐ SM680000	 SF230000	 SF390000	 SF040000	Θ GT620000	• SA790000
-A	● SM750002	→ SM310000	* SM040000	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	└ SM660000	 SF240000	 SF400000	 SF010000	Ω GO320000	• SD630000
-B	♂ SM280000	← SM300000	+ SA010000	;	K LK020000	[SM060000	k LK010000	{ SM110000	ï LI170000	¢ SC040000	½ NF010000	 SF250000	 SF410000	 SF610000	δ GD010000	√ SA800000
-C	♀ SM290000	└ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	£ SC020000	¼ NF040000	 SF260000	 SF420000	 SF570000	∞ SA450000	ⁿ LN011000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	ì LI130000	¥ SC050000	¡ SP030000	 SF270000	 SF430000	 SF580000	φ GF010001	² ND021000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	Þrs SC060000	« SP170000	 SF280000	 SF440000	 SF590000	ε GE010000	■ SM470000
-F	☀ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	◊ SM790000	Å LA280000	f SC070000	» SP180000	 SF030000	 SF450000	 SF600000	∩ SA380000	(RSP) SP300000

Code Page 00437

Greek (MS DOS)

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		▶	(SP)	0	@	P	`	p	A	P	ι	☐	☐	☐	ω	Ω
		SM590000	SP010000	ND100000	SM050000	LP020000	SD130000	LP010000	GA020000	GR020000	GI010000	SF140000	SF020000	SF460000	GO310000	GO720000
-1	☺	◀	!	1	A	Q	a	q	B	Σ	κ	☐	☐	☐	ά	±
	SS000000	SM630000	SP020000	ND010000	LA020000	LQ020000	LA010000	LQ010000	GB020000	GS020000	GK010000	SF150000	SF070000	SF470000	GA110000	SA020000
-2	☹	↕	"	2	B	R	b	r	Γ	T	λ	☐	☐	☐	έ	≥
	SS010000	SM760000	SP040000	ND020000	LB020000	LR020000	LB010000	LR010000	GG020000	GT020000	GL010000	SF160000	SF060000	SF480000	GE110000	SA530000
-3	♥	!!	#	3	C	S	c	s	Δ	Υ	μ	☐	☐	☐	ή	≤
	SS020000	SP330000	SM010000	ND030000	LC020000	LS020000	LC010000	LS010000	GD020000	GU020000	GM010000	SF110000	SF080000	SF490000	GE710000	SA520000
-4	♦	¶	\$	4	D	T	d	t	E	Φ	ν	☐	☐	☐	ï	ï
	SS030000	SM250000	SC030000	ND040000	LD020000	LT020000	LD010000	LT010000	GE020000	GF020000	GN010000	SF090000	SF100000	SF500000	GI170000	GI180000
-5	♣	§	%	5	E	U	e	u	Z	X	ξ	☐	☐	☐	í	ÿ
	SS040000	SM240000	SM020000	ND050000	LE020000	LU020000	LE010000	LU010000	GZ020000	GH020000	GX010000	SF190000	SF050000	SF510000	GI110000	GU180000
-6	♠	▬	&	6	F	V	f	v	H	Ψ	ο	☐	☐	☐	ó	÷
	SS050000	SM700000	SM030000	ND060000	LF020000	LV020000	LF010000	LV010000	GE320000	GP620000	GO010000	SF200000	SF360000	SF520000	GO110000	SA060000
-7	●	↕	'	7	G	W	g	w	Θ	Ω	π	☐	☐	☐	ύ	≈
	SM570000	SM770000	SP050000	ND070000	LG020000	LW020000	LG010000	LW010000	GT620000	GO320000	GP010000	SF210000	SF370000	SF530000	GU110000	SA700000
-8	◼	↑	(	8	H	X	h	x	I	α	ρ	☐	☐	☐	ü	°
	SM570001	SM320000	SP060000	ND080000	LH020000	LX020000	LH010000	LX010000	GI020000	GA010000	GR010000	SF220000	SF380000	SF540000	GU170000	SM190000
-9	○	↓	)	9	I	Y	i	y	K	β	σ	☐	☐	☐	ώ	•
	SM750000	SM330000	SP070000	ND090000	LI020000	LY020000	LI010000	LY010000	GK020000	GB010000	GS010000	SF230000	SF390000	SF040000	GO710000	SA790000
-A	◐	→	*	:	J	Z	j	z	Λ	γ	ς	☐	☐	☐	Ά	•
	SM750002	SM310000	SM040000	SP130000	LJ020000	LZ020000	LJ010000	LZ010000	GL020000	GG010000	GS610000	SF240000	SF400000	SF010000	GA120000	SD630000
-B	♂	←	+	;	K	[	k	{	M	δ	τ	☐	☐	☐	Έ	✓
	SM280000	SM300000	SA010000	SP140000	LK020000	SM060000	LK010000	SM110000	GM020000	GD010000	GT010000	SF250000	SF410000	SF610000	GE120000	SA800000
-C	♀	└	,	<	L	\	l	|	N	ε	υ	☐	☐	☐	Ή	ˆ
	SM290000	SA420000	SP080000	SA030000	LL020000	SM070000	LL010000	SM130000	GN020000	GE010000	GU010000	SF260000	SF420000	SF570000	GE720000	LN011000
-D	♪	↔	-	=	M	]	m	}	E	ζ	φ	☐	☐	☐	Ί	²
	SM930000	SM780000	SP100000	SA040000	LM020000	SM080000	LM010000	SM140000	GX020000	GZ010000	GF010000	SF270000	SF430000	SF580000	GI120000	ND021000
-E	♫	▲	.	>	N	^	n	~	O	η	χ	☐	☐	☐	Ό	■
	SM910000	SM600000	SP110000	SA050000	LN020000	SD150000	LN010000	SD190000	GO020000	GE310000	GH010000	SF280000	SF440000	SF590000	GO120000	SM470000
-F	☼	▼	/	?	O	_	o	◊	Π	θ	ψ	☐	☐	☐	Υ	(RSP)
	SM690000	SV040000	SP120000	SP150000	LO020000	SP090000	LO010000	SM790000	GP020000	GT610000	GP610000	SF030000	SF450000	SF600000	GU120000	SP300000

C8QR0147

Code Page 00737

Greek/Latin (ISO 8859-7)

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000			(RSP) SP300000	° SM190000	í GI730000	Π GP020000	ύ GU730000	π GP010000
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000			‘ SP190000	± SA020000	Α GA020000	Ρ GR020000	α GA010000	ρ GR010000
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000			, SP200000	² ND021000	Β GB020000		β GB010000	ς GS610000
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000			£ SC020000	³ ND031000	Γ GG020000	Σ GS020000	γ GG010000	σ GS010000
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000				' SD110000	Δ GD020000	Τ GT020000	δ GD010000	τ GT010000
-5			% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000				˙ SD730000	Ε GE020000	Υ GU020000	ε GE010000	υ GU010000
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000			! SM650000	Α GA120000	Z GZ020000	Φ GF020000	ζ GZ010000	φ GF010000
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000			§ SM240000	· SD630000	H GE320000	X GH020000	η GE310000	χ GH010000
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000			" SD170000	Έ GE120000	Θ GT620000	Ψ GP620000	ϑ GT610000	ψ GP610000
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000			© SM520000	Ή GE720000	Ι GI020000	Ω GO320000	ι GI010000	ω GO310000
-A			* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000				Ί GI120000	K GK020000	Ϊ GI180000	κ GK010000	ϊ GI170000
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000			« SP170000	» SP180000	Λ GL020000	Ỳ GU180000	λ GL010000	ÿ GU170000
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000			⌋ SM660000	Ό GO120000	M GM020000	ά GA110000	μ GM010000	ό GO110000
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000			(SHY) SP320000	½ NF010000	N GN020000	έ GE110000	ν GN010000	ύ GU110000
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000				Υ GU120000	Ξ GX020000	ή GE710000	ξ GX010000	ώ GO710000
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000				— SM120000	Ω GO720000	O GO020000	ί GI110000	ο GO010000	

Code Page 00813

Latin 1 (ISO 8859-1)

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000			(RSP) SP300000	° SM190000	À LA140000	Ð LD620000	à LA130000	ð LD630000
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000			ì SP030000	± SA020000	Á LA120000	Ñ LN200000	á LA110000	ñ LN190000
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000			¢ SC040000	² ND021000	Â LA160000	Ò LO140000	â LA150000	ò LO130000
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000			£ SC020000	³ ND031000	Ã LA200000	Ó LO120000	ã LA190000	ó LO110000
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000			¤ SC010000	' SD110000	Ä LA180000	Ô LO160000	ä LA170000	ô LO150000
-5			% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000			¥ SC050000	µ SM170000	Å LA280000	Ö LO200000	å LA270000	ö LO190000
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000			¦ SM650000	¶ SM250000	Æ LA520000	Ö LO180000	æ LA510000	ö LO170000
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000			§ SM240000	· SD630000	Ç LC420000	×	ç LC410000	÷ SA060000
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000			¨ SD170000	¸ SD410000	È LE140000	Ø LO620000	è LE130000	ø LO610000
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000			© SM520000	¹ ND011000	É LE120000	Ù LU140000	é LE110000	ù LU130000
-A			* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000			ª SM210000	º SM200000	Ê LE160000	Ú LU120000	ê LE150000	ú LU110000
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000			« SP170000	» SP180000	Ë LE180000	Û LU160000	ë LE170000	û LU150000
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000			¬ SM660000	¼ NF040000	Ì LI140000	Ü LU180000	ì LI130000	ü LU170000
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000			(SHY) SP320000	½ NF010000	Í LI120000	Ý LY120000	í LI110000	ý LY110000
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000			® SM530000	¾ NF050000	Î LI160000	Þ LT640000	î LI150000	þ LT630000
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000				¯ SM150000	¿ SP160000	Ï LI180000	ß LS610000	ï LI170000	ÿ LY170000

Code Page 00819

PC Multilingual

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		►	(SP)	0	@	P	`	p	Ç	É	á			ø	Ó	(SHY)
-1	☺	◄	!	1	A	Q	a	q	ü	æ	í			Ð	ß	±
-2	☹	↕	"	2	B	R	b	r	é	Æ	ó			Ê	Ô	=
-3	♥	!!	#	3	C	S	c	s	â	ô	ú			Ë	Ò	¾
-4	♦	¶	\$	4	D	T	d	t	ä	ö	ñ			È	õ	¶
-5	♣	§	%	5	E	U	e	u	à	ò	Ñ	Á		ı	Õ	§
-6	♠	—	&	6	F	V	f	v	å	û	ä	Â	ã	Î	μ	÷
-7	•	↕	'	7	G	W	g	w	ç	ù	º	À	Ã	Î	þ	¸
-8	■	↑	(	8	H	X	h	x	ê	ÿ	ı	©		İ	Þ	°
-9	○	↓	)	9	I	Y	i	y	ë	Ö	®			Ú	“	
-A	●	→	*	:	J	Z	j	z	è	Ü	¬			Û	•	
-B	♂	←	+	;	K	[	k	{	ï	ø	½			Ù	¹	
-C	♀	└	,	<	L	\	l	|	î	£	¼			Ý	³	
-D	♪	↔	-	=	M	]	m	}	ì	Ø	ı	¢		ı	Ý	²
-E	🎵	▲	.	>	N	^	n	~	Ä	×	«	¥		İ	—	■
-F	☀	▼	/	?	O	_	o	◊	Å	f	»			’		(RSP)

Code Page 00850

Old Greek

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓																
-0		▶ SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	ı GI120000	İ GI170000	■ SF140000	□ SF020000	T GT020000	ζ GZ010000	(SHY) SP320000
-1	☺ SS000000	◀ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000		ı̇ GI730000	■ SF150000	□ SF070000	Y GU020000	η GE310000	± SA020000
-2	☹ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	’O GO120000	ó GO110000	■ SF160000	□ SF060000	Φ GF020000	g GT610000	v GU010000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú GU110000	□ SF110000	□ SF080000	X GH020000	ι GI010000	φ GF010000
-4	♦ SS030000	¶ SM250000	\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	A GA020000	□ SF090000	□ SF100000	Ψ GP620000	κ GK010000	χ GH010000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	’Y GU120000	B GB020000	K GK020000	□ SF050000	Ω GO320000	λ GL010000	§ SM240000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	’A GA120000	û LU150000	Γ GG020000	Λ GL020000	Π GP020000	α GA010000	μ GM010000	ψ GP610000
-7	• SM570000	↕ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	ù LU130000	Δ GD020000	M GM020000	P GR020000	β GB010000	v GN010000	◌ SD410000
-8	■ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	’Ω GO720000	E GE020000	N GN020000	□ SF380000	γ GG010000	ξ GX010000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	Z GZ020000	□ SF230000	□ SF390000	□ SF040000	o GO010000	” SD170000
-A	● SM750002	→ SM310000	* SM040000	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	H GE320000	□ SF240000	□ SF400000	□ SF010000	π GP010000	ω GO310000
-B	♂ SM280000	← SM300000	÷ SA010000	;	K LK020000	[SM060000	k LK010000	{ SM110000	ï LI170000	á GA110000	½ NF010000	□ SF250000	□ SF410000	■ SF610000	ρ GR010000	ü GU170000
-C	♀ SM290000	⌞ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	£ SC020000	Θ GT620000	□ SF260000	□ SF420000	■ SF570000	σ GS010000	ı̇ GU730000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	’E GE120000	é GE110000	I GI020000	Ξ GX020000	□ SF430000	δ GD010000	ς GS610000	ώ GO710000
-E	♪ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	ή GE710000	« SP170000	O GO020000	□ SF440000	ε GE010000	τ GT010000	■ SM470000
-F	☀ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	◻ SM790000	’H GE720000	ı̇ GI110000	» SP180000	□ SF030000	Σ GS020000	■ SF600000	' SD110000	(RSP) SP300000

Code Page 00851

Latin 2/ROECE

HEX DIGITS																
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓																
-0		► SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	á LA110000	☐ SF140000	☐ SF020000	đ LD610000	Ó LO120000	(SHY) SP320000
-1	☺ SS000000	◄ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	Ł LL120000	í LI110000	☐ SF150000	☐ SF070000	Đ LD620000	ß LS610000	" SD250000
-2	☹ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Í LI110000	ó LO110000	☐ SF160000	☐ SF060000	Ď LD220000	Ô LO160000	˘ SD430000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	☐ SF110000	☐ SF080000	Ë LE180000	Ň LN120000	˘ SD210000
-4	♦ SS030000	¶ SM250000	\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	À LA440000	☐ SF090000	☐ SF100000	ď LD210000	ń LN110000	˘ SD230000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	û LU270000	Ľ LL220000	ą LA430000	Á LA120000	☐ SF050000	Ň LN220000	ň LN210000	§ SM240000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	ć LC110000	Ĳ LL210000	Ž LZ220000	Â LA160000	Ă LA240000	Î LI220000	Š LS220000	÷ SA060000
-7	● SM570000	↕ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	Ś LS120000	ž LZ210000	Ě LE220000	ǎ LA230000	Î LI160000	š LS210000	˘ SD410000
-8	◼ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ł LL610000	ś LS110000	Ę LE440000	Ş LS420000	☐ SF380000	ě LE210000	Ř LR120000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	ę LE430000	☐ SF230000	☐ SF390000	☐ SF040000	Ú LU120000	˘ SD170000
-A	◐ SM750002	→ SM310000	* SM040000	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	Ő LO260000	Ü LU180000		☐ SF240000	☐ SF400000	☐ SF010000	í LR110000	˘ SD290000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	ő LO250000	Ť LT220000	ž LZ110000	☐ SF250000	☐ SF410000	☐ SF610000	Ů LU260000	ů LU250000
-C	♀ SM290000	└ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	ť LT210000	č LC220000	☐ SF260000	☐ SF420000	☐ SF570000	ý LY110000	Ř LR220000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	Ž LZ120000	Ł LL620000	ş LS410000	Ž LZ300000	☐ SF430000	Ţ LT420000	Ý LY120000	ř LR210000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	× SA070000	« SP170000	ž LZ290000	☐ SF440000	Ů LU280000	ţ LT410000	■ SM470000
-F	☀ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	◻ SM790000	Ć LC120000	č LC210000	» SP180000	☐ SF030000	☐ SC010000	☐ SF600000	' SD110000	(RSP) SP300000

Code Page 00852

Latin 3 (PC)

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		► SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	á LA110000	☐ SF140000	☐ SF020000		Ó LO120000	(SHY) SP320000
-1	☺ SS000000	◄ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	è LC290000	í LI110000	☐ SF150000	☐ SF070000		ß LS610000	
-2	☹ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Ĉ LC300000	ó LO110000	☐ SF160000	☐ SF060000	Ê LE160000	Ô LO160000	ℓ SM160000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	☐ SF110000	☐ SF080000	Ë LE180000	Ò LO140000	'n LN630000
-4	♦ SS030000	¶ SM250000	\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	ñ LN190000	☐ SF090000	☐ SF100000	È LE140000	Ğ LG300000	˘ SD230000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	ò LO130000	Ñ LN200000	Á LA120000	☐ SF050000	ı LI610000	ġ LG290000	§ SM240000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	ê LC150000	û LU150000	Ĝ LG240000	Â LA160000	Ŝ LS160000	Î LI200000	μ SM170000	÷ SA060000
-7	• SM570000	↕ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	ù LU130000	ğ LG230000	À LA140000	ș LS150000	Î LI160000	Ĥ LH620000	˙ SD410000
-8	◼ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	ï LI300000	Ĥ LH160000	Ş LS420000	☐ SF380000	İ LI180000	ħ LH610000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	ĥ LH150000	☐ SF230000	☐ SF390000	☐ SF040000	Ú LU120000	˝ SD170000
-A	◐ SM750002	→ SM310000	* SM040000	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000		☐ SF240000	☐ SF400000	☐ SF010000	Û LU160000	• SD290000
-B	♂ SM280000	← SM300000	+ SA010000	;	K LK020000	[SM060000	k LK010000	{ SM110000	ï LI170000	ĝ LG150000	½ NF010000	☐ SF250000	☐ SF410000	☐ SF610000	Ù LU140000	
-C	♀ SM290000	└ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	£ SC020000	Ĵ LJ160000	☐ SF260000	☐ SF420000	☐ SF570000	Ŭ LU240000	³ ND031000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	ì LI130000	Ĝ LG160000	ş LS410000	Ž LZ300000	☐ SF430000		ŭ LU230000	² ND021000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	× SA070000	« SP170000	ž LZ290000	☐ SF440000	İ LI140000	• SD630000	■ SM470000
-F	☀ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	◻ SM790000	Ĉ LC160000	ĵ LJ150000	» SP180000	☐ SF030000	☐ SC010000	☐ SF600000	' SD110000	(RSP) SP300000

Code Page 00853

Cyrillic (PC)

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		►	(SP)	0	@	P	`	p	ђ	љ	а			л	Я	(SHY)
		SM590000	SP010000	ND100000	SM050000	LP020000	SD130000	LP010000	KD610000	KL410000	KA010000	SF140000	SF020000	KL010000	KA160000	SP320000
-1	☺	◄	!	1	A	Q	a	q	Ђ	Љ	А			Л	р	ы
	SS000000	SM630000	SP020000	ND010000	LA020000	LQ020000	LA010000	LQ010000	KD620000	KL420000	KA020000	SF150000	SF070000	KL020000	KR010000	KY010000
-2	☹	↕	"	2	B	R	b	r	ѓ	њ	б			м	Р	Ы
	SS010000	SM760000	SP040000	ND020000	LB020000	LR020000	LB010000	LR010000	KG110000	KN110000	KB010000	SF160000	SF060000	KM010000	KR020000	KY020000
-3	♥	!!	#	3	C	S	c	s	ѓ	њ	Б			М	с	з
	SS020000	SP330000	SM010000	ND030000	LC020000	LS020000	LC010000	LS010000	KG120000	KN120000	KB020000	SF110000	SF080000	KM020000	KS010000	KZ010000
-4	♦	¶	\$	4	D	T	d	t	ё	ћ	ц			н	С	З
	SS030000	SM250000	SC030000	ND040000	LD020000	LT020000	LD010000	LT010000	KE170000	KC110000	KC010000	SF090000	SF100000	KN010000	KS020000	KZ020000
-5	♣	§	%	5	E	U	e	u	Ё	Ћ	Ц	х		Н	т	ш
	SS040000	SM240000	SM020000	ND050000	LE020000	LU020000	LE010000	LU010000	KE180000	KC120000	KC020000	KN010000	SF050000	KN020000	KT010000	KS210000
-6	♠	▬	&	6	F	V	f	v	ё	ќ	д	Х	к	о	Т	Ш
	SS050000	SM700000	SM030000	ND060000	LF020000	LV020000	LF010000	LV010000	KE150000	KK110000	KD010000	KN020000	KK010000	KO010000	KT020000	KS220000
-7	●	↕	'	7	G	W	g	w	Є	Ќ	Д	и	К	О	у	э
	SM570000	SM770000	SP050000	ND070000	LG020000	LW020000	LG010000	LW010000	KE160000	KK120000	KD020000	KI010000	KK020000	KO020000	KU010000	KE130000
-8	■	↑	(	8	H	X	h	x	с	ђ	е	И		п	У	Э
	SM570001	SM320000	SP060000	ND080000	LH020000	LX020000	LH010000	LX010000	KZ150000	KU230000	KE010000	KI020000	SF380000	KP010000	KU020000	KE140000
-9	○	↓	)	9	I	Y	i	y	Ѕ	Ў	Е			ж	Щ	
	SM750000	SM330000	SP070000	ND090000	LI020000	LY020000	LI010000	LY010000	KZ160000	KU240000	KE020000	SF230000	SF390000	SF040000	KZ210000	KS150000
-A	●	→	*	:	J	Z	j	z	і	ц	ф			Ж	Щ	
	SM750002	SM310000	SM040000	SP130000	LJ020000	LZ020000	LJ010000	LZ010000	KI110000	KG210000	KF010000	SF240000	SF400000	SF010000	KZ220000	KS160000
-B	♂	←	+	;	K	[	k	{	І	Ц	Ф			В	Ч	
	SM280000	SM300000	SA010000	SP140000	LK020000	SM060000	LK010000	SM110000	KI120000	KG220000	KF020000	SF250000	SF410000	SF610000	KV010000	KC210000
-C	♀	└	,	<	L	\	l	|	İ	Ю	Г			В	Ч	
	SM290000	SA420000	SP080000	SA030000	LL020000	SM070000	LL010000	SM130000	KI170000	KU150000	KG010000	SF260000	SF420000	SF570000	KV020000	KC220000
-D	♪	↔	-	=	M	]	m	}	İ	Ю	Г	й		П	ь	§
	SM930000	SM780000	SP100000	SA040000	LM020000	SM080000	LM010000	SM140000	KI180000	KU160000	KG020000	KJ110000	SF430000	KP020000	KX110000	SM240000
-E	♪	▲	.	>	N	^	n	~	j	ъ	«	Й		я	Ь	■
	SM910000	SM600000	SP110000	SA050000	LN020000	SD150000	LN010000	SD190000	KJ010000	KU210000	SP170000	KJ120000	SF440000	KA150000	KX120000	SM470000
-F	☀	▼	/	?	O	_	o	◊	J	Ъ	»			№	(RSP)	
	SM690000	SV040000	SP120000	SP150000	LO020000	SP090000	LO010000	SM790000	KJ020000	KU220000	SP180000	SF030000	SC010000	SF600000	SM000000	SP300000

Code Page 00855

Latin 5-Turkey + euro

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		▶	(SP)	0	@	P	`	p	Ç	É	á			◊	Ó	(ŠŸ)
		SM590000	SP010000	ND010000	SM050000	LP020000	SD130000	LP010000	LC420000	LE120000	LA110000	SF140000	SF020000	SM200000	LO120000	SP320000
-1	☺	◀	!	1	A	Q	a	q	ü	æ	í			²	ß	±
	SS000000	SM630000	SP020000	ND010000	LA020000	LQ020000	LA010000	LQ010000	LU170000	LA510000	LI110000	SF150000	SF070000	SM210000	LS610000	SA020000
-2	☹	↕	"	2	B	R	b	r	é	Æ	ó			Ê	Ô	
	SS010000	SM760000	SP040000	ND020000	LB020000	LR020000	LB010000	LR010000	LE110000	LA520000	LO110000	SF160000	SF060000	LE160000	LO160000	
-3	♥	!!	#	3	C	S	c	s	â	ô	ú			Ë	Ò	¾
	SS020000	SP330000	SM030000	ND030000	LC020000	LS020000	LC010000	LS010000	LA150000	LO150000	LU110000	SF110000	SF080000	LE180000	LO140000	NF050000
-4	♦	¶	\$	4	D	T	d	t	ä	ö	ñ			È	õ	¶
	SS030000	SM250000	SC030000	ND040000	LD020000	LT020000	LD010000	LT010000	LA170000	LO170000	LN190000	SF090000	SF100000	LE140000	LO190000	SM250000
-5	♣	§	%	5	E	U	e	u	à	ò	Ñ	Á		€	Ö	§
	SS040000	SM240000	SM020000	ND050000	LE020000	LU020000	LE010000	LU010000	LA130000	LO130000	LN200000	LA120000	SF050000	SC200000	LO200000	SM240000
-6	♠	—	&	6	F	V	f	v	å	û	Ğ	Â	ã	İ	μ	÷
	SS050000	SM700000	SM030000	ND060000	LF020000	LV020000	LF010000	LV010000	LA270000	LU150000	LG240000	LA160000	LA190000	LI120000	SM170000	SA060000
-7	●	↕	'	7	G	W	g	w	ç	ù	ğ	À	Ã	Î		¸
	SM570000	SM770000	SP050000	ND070000	LG020000	LW020000	LG010000	LW010000	LC410000	LU130000	LG230000	LA140000	LA200000	LI160000		SD410000
-8	◼	↑	(	8	H	X	h	x	ê	İ	ı	©		Ï	×	°
	SM570001	SM320000	SP060000	ND080000	LH020000	LX020000	LH010000	LX010000	LE150000	LI300000	SP160000	SM520000	SF380000	LI180000	SA070000	SM190000
-9	◯	↓	)	9	I	Y	i	y	ë	Ö	®			Û	“	
	SM750000	SM330000	SP070000	ND090000	LI020000	LY020000	LI010000	LY010000	LE170000	LO180000	SM530000	SF230000	SF390000	SF040000	LU120000	SD170000
-A	◐	→	*	:	J	Z	j	z	è	Ü	¬			Ü	•	
	SM750002	SM310000	SM040000	SP130000	LJ020000	LZ020000	LJ010000	LZ010000	LE130000	LU180000	SM660000	SF240000	SF400000	SF010000	LU160000	SD630000
-B	♂	←	+	;	K	[	k	{	ï	ø	½			Ù	¹	
	SM280000	SM300000	SA010000	SP140000	LK020000	SM060000	LK010000	SM110000	LI170000	LO610000	NF010000	SF250000	SF410000	SF610000	LU140000	ND011000
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	SM290000	SA420000	SP080000	SA030000	LL020000	SM070000	LL010000	SM130000	LI150000	SC020000	NF040000	SF260000	SF420000	SF570000	LI130000	ND031000
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	SM930000	SM780000	SP100000	SA040000	LM020000	SM080000	LM010000	SM140000	LI610000	LO620000	SP030000	SC040000	SF430000	SM650000	LY170000	ND021000
-E	♫	▲	.	>	N	^	n	~	Ä	Ş	«	¥		ı	—	■
	SM910000	SM600000	SP110000	SA050000	LN020000	SD150000	LN010000	SD190000	LA180000	LS420000	SP170000	SC050000	SF440000	LI140000	SM150000	SM470000
-F	☀	▼	/	?	O	_	o	◡	Å	ş	»			'		(RSP)
	SM690000	SV040000	SP120000	SP150000	LO020000	SP090000	LO010000	SM790000	LA280000	LS410000	SP180000	SF030000	SC010000	SF600000	SD110000	SP300000

Code Page 00857

PC Multilingual + euro

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		▶	(SP)	0	@	P	`	p	Ç	É	á			ø	Ó	(ŠŸ)
-1	☺	◀	!	1	A	Q	a	q	ü	æ	í			Ð	ß	±
-2	☹	↕	"	2	B	R	b	r	é	Æ	ó			Ê	Ô	=
-3	♥	!!	#	3	C	S	c	s	â	ô	ú			Ë	Ò	¾
-4	♦	¶	\$	4	D	T	d	t	ä	ö	ñ			È	õ	¶
-5	♣	§	%	5	E	U	e	u	à	ò	Ñ	Á		€	Õ	§
-6	♠	—	&	6	F	V	f	v	å	û	ª	Â	ã	Í	μ	÷
-7	●	↕	'	7	G	W	g	w	ç	ù	º	À	Ã	Î	þ	,
-8	◼	↑	(8	H	X	h	x	ê	ÿ	¿	©		Ï	Ɔ	°
-9	○	↓)	9	I	Y	i	y	ë	Ö	®			Ú	“	
-A	◐	→	*	:	J	Z	j	z	è	Ü	¬			Û	•	
-B	♂	←	+	;	K	[k	{	ï	ø	½			Ü	¹	
-C	♀	└	,	<	L	\	l		î	£	¼			Ý	³	
-D	♪	↔	-	=	M]	m	}	ì	Ø	¡	¢		Ý	²	
-E	♫	▲	.	>	N	^	n	~	Ä	×	«	¥		ÿ	—	■
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C7QR0148

Code Page 00858

Portuguese

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		▶ SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	á LA110000	☐ SF140000	☐ SF020000	☐ SF460000	α GA010000	≡ SA480000
-1	☺ SS000000	◀ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	À LA140000	í LI110000	☐ SF150000	☐ SF070000	☐ SF470000	β LS610000	± SA020000
-2	☹ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	È LE140000	ó LO110000	☐ SF160000	☐ SF060000	☐ SF480000	Γ GG020000	≥ SA530000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	☐ SF110000	☐ SF080000	☐ SF490000	π GP010000	≤ SA520000
-4	♦ SS030000	¶ SM250000	\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ã LA190000	õ LO190000	ñ LN190000	☐ SF090000	☐ SF100000	☐ SF500000	Σ GS020000	ƒ SS260000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	ò LO130000	Ñ LN200000	☐ SF190000	☐ SF050000	☐ SF510000	σ GS010000	J SS270000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	Á LA120000	Ú LU120000	ª SM210000	☐ SF200000	☐ SF360000	☐ SF520000	μ GM010000	÷ SA060000
-7	• SM570000	↕ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	ù LU130000	º SM200000	☐ SF210000	☐ SF370000	☐ SF530000	τ GT010000	≈ SA700000
-8	◼ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	ì LI140000	¿ SP160000	☐ SF220000	☐ SF380000	☐ SF540000	Φ GF020000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	Ê LE160000	Õ LO200000	Ò LO140000	☐ SF230000	☐ SF390000	☐ SF040000	Θ GT620000	• SA790000
-A	◉ SM750002	→ SM310000	* SM040000	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	¬ SM660000	☐ SF240000	☐ SF400000	☐ SF010000	Ω GO320000	· SD630000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	Í LI120000	¢ SC040000	½ NF010000	☐ SF250000	☐ SF410000	☐ SF610000	δ GD010000	√ SA800000
-C	♀ SM290000	└ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	Ô LO160000	£ SC020000	¼ NF040000	☐ SF260000	☐ SF420000	☐ SF570000	∞ SA450000	ⁿ LN011000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	ì LI130000	Ù LU140000	¡ SP030000	☐ SF270000	☐ SF430000	☐ SF580000	φ GF010001	² ND021000
-E	🎵 SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ã LA200000	Pts SC060000	« SP170000	☐ SF280000	☐ SF440000	☐ SF590000	ε GE010000	■ SM470000
-F	☀ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	🏠 SM790000	Â LA160000	Ó LO120000	» SP180000	☐ SF030000	☐ SF450000	☐ SF600000	∩ SA380000	(RSP) SP300000

Code Page 00860

Icelandic

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		► SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	á LA110000	☐ SF140000	☐ SF020000	☐ SF460000	α GA010000	≡ SA480000
-1	☺ SS000000	◄ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	æ LA510000	í LI110000	☐ SF150000	☐ SF070000	☐ SF470000	β LS610000	± SA020000
-2	☹ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Æ LA520000	ó LO110000	☐ SF160000	☐ SF060000	☐ SF480000	Γ GG020000	≥ SA530000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	☐ SF110000	☐ SF080000	☐ SF490000	π GP010000	≤ SA520000
-4	♦ SS030000	¶ SM250000	\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	Á LA120000	☐ SF090000	☐ SF100000	☐ SF500000	Σ GS020000	f SS260000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	þ LT630000	Í LI120000	☐ SF190000	☐ SF050000	☐ SF510000	σ GS010000	J SS270000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	å LA270000	û LU150000	Ó LO120000	☐ SF200000	☐ SF360000	☐ SF520000	μ GM010000	÷ SA060000
-7	• SM570000	↕ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	Ý LY120000	Ú LU120000	☐ SF210000	☐ SF370000	☐ SF530000	τ GT010000	≈ SA700000
-8	◼ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	ý LY110000	ı SP160000	☐ SF220000	☐ SF380000	☐ SF540000	Φ GF020000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	┐ SM680000	☐ SF230000	☐ SF390000	☐ SF040000	Θ GT620000	• SA790000
-A	◐ SM750002	→ SM310000	* SM040000	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	┐ SM660000	☐ SF240000	☐ SF400000	☐ SF010000	Ω GO320000	• SD630000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	Ð LD620000	ø LO610000	½ NF010000	☐ SF250000	☐ SF410000	☐ SF610000	δ GD010000	√ SA800000
-C	♀ SM290000	└ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	ð LD630000	£ SC020000	¼ NF040000	☐ SF260000	☐ SF420000	☐ SF570000	∞ SA450000	ⁿ LN011000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	Þ LT640000	Ø LO620000	ı SP030000	☐ SF270000	☐ SF430000	☐ SF580000	φ GF010001	² ND021000
-E	♪ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	Pts SC060000	« SP170000	☐ SF280000	☐ SF440000	☐ SF590000	ε GE010000	■ SM470000
-F	☀ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	◻ SM790000	Å LA280000	f SC070000	» SP180000	☐ SF030000	☐ SF450000	☐ SF600000	∩ SA380000	(RSP) SP300000

















































Code Page 00861

Hebrew

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		▶ SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	א HX330000	י HN010000	á LA110000	☐ SF140000	☐ SF020000	☐ SF460000	α GA010000	≡ SA480000
-1	☺ SS000000	◀ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ב HB010000	ס HS010000	í LI110000	☐ SF150000	☐ SF070000	☐ SF470000	β LS610000	± SA020000
-2	☹ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	ג HG010000	ע HX350000	ó LO110000	☐ SF160000	☐ SF060000	☐ SF480000	Γ GG020000	≥ SA530000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	ד HD010000	ף HP610000	ú LU110000	☐ SF110000	☐ SF080000	☐ SF490000	π GP010000	≤ SA520000
-4	♦ SS030000	¶ SM250000	\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ה HH010000	פ HP010000	ñ LN190000	☐ SF090000	☐ SF100000	☐ SF500000	Σ GS020000	ℓ SS260000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	ו HW010000	ץ HS610000	Ñ LN200000	☐ SF190000	☐ SF050000	☐ SF510000	σ GS010000	J SS270000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	ז HZ010000	צ HS450000	ǎ SM210000	☐ SF200000	☐ SF360000	☐ SF520000	μ GM010000	÷ SA060000
-7	● SM570000	↕ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ח HH450000	ק HQ010000	ó SM200000	☐ SF210000	☐ SF370000	☐ SF530000	τ GT010000	≈ SA700000
-8	◼ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ט HT450000	ך HR010000	ı SP160000	☐ SF220000	☐ SF380000	☐ SF540000	Φ GF020000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	י HY010000	ש HS210000	◡ SM680000	☐ SF230000	☐ SF390000	☐ SF040000	Θ GT620000	• SA790000
-A	◐ SM750002	→ SM310000	* SM040000	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	ך HK610000	ת HT010000	◡ SM660000	☐ SF240000	☐ SF400000	☐ SF010000	Ω GO320000	• SD630000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	ב HK010000	ץ SC040000	½ NF010000	☐ SF250000	☐ SF410000	☐ SF610000	δ GD010000	√ SA800000
-C	♀ SM290000	⌞ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	כ HL010000	£ SC020000	¼ NF040000	☐ SF260000	☐ SF420000	☐ SF570000	∞ SA450000	ⁿ LN011000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	ם HM610000	¥ SC050000	ı SP030000	☐ SF270000	☐ SF430000	☐ SF580000	φ GF010001	² ND021000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	נ HM010000	Pts SC060000	« SP170000	☐ SF280000	☐ SF440000	☐ SF590000	ε GE010000	■ SM470000
-F	☀ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	◡ SM790000	ן HN610000	f SC070000	» SP180000	☐ SF030000	☐ SF450000	☐ SF600000	∩ SA380000	(RSP) SP300000

Code Page 00862

Canadian French

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		▶ SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	¡ SM650000	 SF140000	 SF020000	 SF460000	α GA010000	≡ SA480000
-1	☺ SS000000	◀ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	È LE140000	' SD110000	 SF150000	 SF070000	 SF470000	β LS610000	± SA020000
-2	☹ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Ê LE160000	ó LO110000	 SF160000	 SF060000	 SF480000	Γ GG020000	≥ SA530000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	 SF110000	 SF080000	 SF490000	π GP010000	≤ SA520000
-4	♦ SS030000	¶ SM250000	\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	Â LA160000	Ë LE180000	¨ SD170000	 SF090000	 SF100000	 SF500000	Σ GS020000	ƒ SS260000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA180000	Ï LI180000	, SD410000	 SF190000	 SF050000	 SF510000	σ GS010000	J SS270000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	¶ SM250000	û LU150000	³ ND031000	 SF200000	 SF360000	 SF520000	μ GM010000	÷ SA060000
-7	● SM570000	↕ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	ù LU130000	- SM150000	 SF210000	 SF370000	 SF530000	τ GT010000	≈ SA700000
-8	■ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	⌘ SC010000	Î LI160000	 SF220000	 SF380000	 SF540000	Φ GF020000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ô LO160000	┐ SM680000	 SF230000	 SF390000	 SF040000	Θ GT620000	• SA790000
-A	◉ SM750002	→ SM310000	* SM040000	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	└ SM660000	 SF240000	 SF400000	 SF010000	Ω GO320000	· SD630000
-B	♂ SM280000	← SM300000	+ SA010000	;	K LK020000	[SM060000	k LK010000	{ SM110000	ï LI170000	¢ SC040000	½ NF010000	 SF250000	 SF410000	 SF610000	δ GD010000	√ SA800000
-C	♀ SM290000	└ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	£ SC020000	¼ NF040000	 SF260000	 SF420000	 SF570000	∞ SA450000	ⁿ LN011000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	== SM100000	Ù LU140000	¾ NF050000	 SF270000	 SF430000	 SF580000	φ GF010001	² ND021000
-E	🎵 SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	À LA140000	Û LU160000	« SP170000	 SF280000	 SF440000	 SF590000	ε GE010000	■ SM470000
-F	☀ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	🏠 SM790000	§ SM240000	f SC070000	» SP180000	 SF030000	 SF450000	 SF600000	∩ SA380000	(RSP) SP300000

Code Page 00863

Arabic

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		►	(SP)	0	@	P	`	p	°	β	(RSP)	•	¢	ذ	—	س
		SM590000	SP010000	ND100000	SM050000	LP020000	SD130000	LP010000	SM190000	GB010000	SP300000	ND100001	SC040000	AD470000	SM860000	AX100004
-1	☺	◄	!	1	A	Q	a	q	•	∞	(SHY)	ا	ء	ر	ف	س
	SS000000	SM630000	SP020000	ND010000	LA020000	LQ020000	LA010000	LQ010000	SD630000	SA450000	SP320000	ND010001	AX300000	AR010000	AF010003	AX100000
-2	♪	↕	"	2	B	R	b	r	•	φ	ل	٢	آ	ز	ق	ن
	SM930000	SM760000	SP040000	ND020000	LB020000	LR020000	LB010000	LR010000	SA790000	GF010001	AA210002	ND020001	AA210000	AZ010000	AQ010003	AN010000
-3	♪	!!	#	3	C	S	c	s	√	±	£	٣	أ	س	ك	ه
	SM910000	SP330000	SM010000	ND030000	LC020000	LS020000	LC010000	LS010000	SA800000	SA020000	SC020000	ND030001	AA310000	AS010003	AK010003	AH010000
-4	☀	¶	\$	4	D	T	d	t	☐	½	☒	٤	ؤ	ش	ل	ف
	SM690000	SM250000	SC030000	ND040000	LD020000	LT020000	LD010000	LT010000	SF150000	NF010000	SC010000	ND040001	AW310000	AS230003	AL010003	AH010004
-5	≡	§	%	5	E	U	e	u	☐	¼	ل	٥	ع	ص	م	ى
	SF430000	SM240000	SM020007	ND050000	LE020000	LU020000	LE010000	LU010000	SF100000	NF040000	AA310002	ND050001	AC470002	AS450003	AM010003	AA020002
-6	||	■	&	6	F	V	f	v	☐	≈		٦	ث	ض	ن	ي
	SF240000	SM700000	SM030000	ND060000	LF020000	LV020000	LF010000	LV010000	SF110000	SA700000		ND060001	AY310000	AD450003	AN010003	AY010002
-7	☒	↕	'	7	G	W	g	w	☒	«		٧	ا	ط	ه	خ
	SF440000	SM770000	SP050000	ND070000	LG020000	LW020000	LG010000	LW010000	SF050000	SP170000		ND070001	AA010000	AT450000	AH010003	AG310004
-8	☒	↑	(	8	H	X	h	x	☒	»	ا	٨	ب	ظ	و	ق
	SF230000	SM320000	SP060000	ND080000	LH020000	LX020000	LH010000	LX010000	SF090000	SP180000	AA010002	ND080001	AB010003	AZ450000	AW010000	AQ010000
-9	☒	↓	)	9	I	Y	i	y	☒	لأ	ب	٩	ة	ء	ى	لأ
	SF410000	SM330000	SP070000	ND090000	LI020000	LY020000	LI010000	LY010000	SF060000	AL320000	AB010000	ND090001	AT020000	AC470003	AA020000	AL220000
-A	☒	→	*	:	J	Z	j	z	☒	لأ	ت	ف	ت	غ	ي	لأ
	SF420000	SM310000	SM040007	SP130000	LJ020000	LZ020000	LJ010000	LZ010000	SF080000	AL320003	AT010000	AF010000	AT010003	AG310003	AY010003	AL220003
-B	☒	←	+	;	K	[	k	{	☒		ث	؛	ث	ا	ض	ل
	SF400000	SM300000	SA010000	SP140000	LK020000	SM060000	LK010000	SM110000	SF070000		AT470000	SP140007	AT470003	SM650000	AD450000	AL010000
-C	☒	ل	,	<	L	\	l	|	☒		،	سر	د	ف	ع	ك
	SF250000	SA420000	SP080000	SA030000	LL020000	SM070000	LL010000	SM130000	SF030000		SP080007	AS010000	AG230003	SM660000	AC470004	AK010000
-D	☒	↔	-	=	M	]	m	}	☒	لا	ج	شر	ح	÷	غ	ي
	SF390000	SM780000	SP100000	SA040000	LM020000	SM080000	LM010000	SM140000	SF010000	AL020000	AG230000	AS230000	AH450003	SA060000	AG310002	AY010000
-E	☒	▲	.	>	N	^	n	~	☒	لا	ح	صر	خ	×	غ	■
	SF380000	SM600000	SP110000	SA050000	LN020000	SD150000	LN010000	SD190000	SF020000	AL020003	AH450000	AS450000	AH470003	SA070000	AG310000	SM470000
-F	☒	▼	/	?	O	_	o	☐	☒	،	خ	؟	د	ع	م	
	SF260000	SV040000	SP120000	SP150000	LO020000	SP090000	LO010000	SM790000	SF040000	SM870000	AH470000	SP150007	AD010000	AC470000	AM010000	

Code Page 00864

Danish/Norwegian

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		► SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	á LA110000	☐ SF140000	☐ SF020000	☐ SF460000	α GA010000	≡ SA480000
-1	☺ SS000000	◄ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	æ LA510000	í LI110000	☐ SF150000	☐ SF070000	☐ SF470000	β LS610000	± SA020000
-2	☹ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Æ LA520000	ó LO110000	☐ SF160000	☐ SF060000	☐ SF480000	Γ GG020000	≥ SA530000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	☐ SF110000	☐ SF080000	☐ SF490000	π GP010000	≤ SA520000
-4	♦ SS030000	¶ SM250000	\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	ñ LN190000	☐ SF090000	☐ SF100000	☐ SF500000	Σ GS020000	f SS260000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	ò LO130000	Ñ LN200000	☐ SF190000	☐ SF050000	☐ SF510000	σ GS010000	J SS270000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	å LA270000	û LU150000	 SM210000	☐ SF200000	☐ SF360000	☐ SF520000	μ GM010000	÷ SA060000
-7	• SM570000	↕ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	ù LU130000	 SM200000	☐ SF210000	☐ SF370000	☐ SF530000	τ GT010000	≈ SA700000
-8	◼ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	ÿ LY170000	ı SP160000	☐ SF220000	☐ SF380000	☐ SF540000	Φ GF020000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	┐ SM680000	☐ SF230000	☐ SF390000	☐ SF040000	Θ GT620000	• SA790000
-A	◐ SM750002	→ SM310000	* SM040000	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	└ SM660000	☐ SF240000	☐ SF400000	☐ SF010000	Ω GO320000	· SD630000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	ï LI170000	ø LO610000	½ NF010000	☐ SF250000	☐ SF410000	☐ SF610000	δ GD010000	√ SA800000
-C	♀ SM290000	└ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	£ SC020000	¼ NF040000	☐ SF260000	☐ SF420000	☐ SF570000	∞ SA450000	ⁿ LN011000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	ì LI130000	Ø LO620000	ı SP030000	☐ SF270000	☐ SF430000	☐ SF580000	φ GF010001	² ND021000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	Pts SC060000	« SP170000	☐ SF280000	☐ SF440000	☐ SF590000	ε GE010000	■ SM470000
-F	☀ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	◊ SM790000	Å LA280000	f SC070000	☐ SC010000	☐ SF030000	☐ SF450000	☐ SF600000	∩ SA380000	(RSP) SP300000

Code Page 00865

PC Data, Cyrillic, Russian

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		▶ SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	A KA020000	P KR020000	a KA010000	▒ SF140000	▒ SF020000	▒ SF460000	p KR010000	Ё KE180000
-1	☺ SS000000	◀ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	Б KB020000	С KS020000	б KB010000	▒ SF150000	▒ SF070000	▒ SF470000	с KS010000	ё KE170000
-2	☹ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	В KV020000	Т KT020000	в KV010000	▒ SF160000	▒ SF060000	▒ SF480000	т KT010000	€ KE160000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	Г KG020000	У KU020000	г KG010000	▒ SF110000	▒ SF080000	▒ SF490000	у KU010000	€ KE150000
-4	♦ SS030000	¶ SM250000	\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	Д KD020000	Ф KF020000	д KD010000	▒ SF090000	▒ SF100000	▒ SF500000	ф KF010000	ї KI180000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	Е KE020000	Х KH020000	е KE010000	▒ SF190000	▒ SF050000	▒ SF510000	х KH010000	і KI170000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	Ж KZ020000	Ц KC020000	ж KZ010000	▒ SF200000	▒ SF360000	▒ SF520000	ц KC010000	Ў KU240000
-7	• SM570000	↕ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	З KZ020000	Ч KC220000	з KZ010000	▒ SF210000	▒ SF370000	▒ SF530000	ч KC210000	ў KU230000
-8	◼ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	И KI020000	Ш KS220000	и KI010000	▒ SF220000	▒ SF380000	▒ SF540000	ш KS210000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	Й KJ120000	Щ KS160000	й KJ110000	▒ SF230000	▒ SF390000	▒ SF040000	щ KS150000	• SA790000
-A	◐ SM750002	→ SM310000	* SM040000	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	К KK020000	Ъ KU220000	к KK010000	▒ SF240000	▒ SF400000	▒ SF010000	ъ KU210000	• SD630000
-B	♂ SM280000	← SM300000	+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	Л KL020000	Ы KY020000	л KL010000	▒ SF250000	▒ SF410000	▒ SF610000	ы KY010000	✓ SA800000
-C	♀ SM290000	└ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	М KM020000	Ь KX120000	м KM010000	▒ SF260000	▒ SF420000	▒ SF570000	ь KX110000	№ SM000000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	Н KN020000	Э KE140000	н KN010000	▒ SF270000	▒ SF430000	▒ SF580000	э KE130000	☒ SC010000
-E	♪ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	О KO020000	Ю KU160000	о KO010000	▒ SF280000	▒ SF440000	▒ SF590000	ю KU150000	■ SM470000
-F	☀ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	◻ SM790000	П KP020000	Я KA160000	п KP010000	▒ SF030000	▒ SF450000	▒ SF600000	я KA150000	(RSP) SP300000

Code Page 00866

Greek New + euro

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		▶ SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000		ı GH120000	ï GH170000	☐ SF140000	☐ SF020000	T GT020000	ζ GZ010000	(SHY) SP320000
-1	☺ SS000000	◀ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000		İ GH180000	í GH1730000	☐ SF150000	☐ SF070000	Y GU020000	η GE310000	± SA020000
-2	☹ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000		Ō GO120000	ó GO110000	☐ SF160000	☐ SF060000	Φ GF020000	θ GT610000	υ GU010000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000			ú GU110000	☐ SF110000	☐ SF080000	X GH020000	ι GI010000	φ GF010000
-4	♦ SS030000	¶ SM250000	\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000			A GA020000	☐ SF090000	☐ SF100000	Ψ GP620000	κ GK010000	χ GH10000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000		Ÿ GU120000	B GB020000	K GK020000	☐ SF050000	Ω GO320000	λ GL010000	§ SM240000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	À GA120000	Ÿ GU180000	Γ GG020000	Λ GL020000	Π GP020000	α GA010000	μ GM010000	ψ GP610000
-7	● SM570000	↕ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	€ SC200000	© SM520000	Δ GD020000	M GM020000	P GR020000	β GB010000	ν GN010000	' SD730000
-8	◼ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	• SD630000	Ω GO720000	E GE020000	N GN020000	☐ SF380000	γ GG010000	ξ GX010000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	⌒ SM660000	² ND021000	Z GZ020000	☐ SF230000	☐ SF390000	☐ SF040000	ο GO010000	¨ SD170000
-A	◐ SM750002	→ SM310000	* SM040000	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	| SM650000	³ ND031000	H GE320000	☐ SF240000	☐ SF400000	☐ SF010000	π GP010000	ω GO310000
-B	♂ SM280000	← SM300000	+ SA010000	;	K LK020000	[SM060000	k LK010000	{ SM110000	' SP190000	á GA110000	½ NF010000	☐ SF250000	☐ SF410000	☐ SF610000	ρ GR010000	ü GU170000
-C	♀ SM290000	L SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	' SP200000	£ SC020000	Θ GT620000	☐ SF260000	☐ SF420000	☐ SF570000	σ GS010000	ú GU730000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	Έ GE120000	έ GE110000	I GI020000	E GX020000	☐ SF430000	δ GD010000	ς GS610000	ώ GO710000
-E	♫ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	— SM120000	ή GE710000	« SP170000	O GO020000	☐ SF440000	ε GE010000	τ GT010000	■ SM470000
-F	☼ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	◻ SM790000	‘H GE720000	ί GI110000	» SP180000	☐ SF030000	Σ GS020000	☐ SF600000	' SD110000	(RSP) SP300000

Code Page 00869

Thai

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000			' BZ100300	๒ BT200000	ภ BP400000	ะ BA200000	เ BE200000	๐ ND100002
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000			ก BK100000	ท BT300000	ม BM100000	ะ BA100000	แ BE300000	๑ ND010002
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000			ข BK200000	ฅ BT400000	ย BY200000	า BA300000	โ BO200000	๒ ND020002
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000			ข BK300000	ณ BN200000	ร BR100000	า BA400000	ใ BA500000	๓ ND030002
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000			ค BK400000	ด BD200000	ถ BR200000	ิ BI100000	เ BA600000	๔ ND040002
-5			% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000			ค BK500000	ต BT500000	ล BL100000	ี BI200000	า BA700000	๕ ND050002
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000			ข BK600000	ถ BT600000	ภ BL200000	ี BU100000	า BQ100000	๖ ND060002
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000			ง BN100000	ท BT700000	ว BW100000	ี BU200000	เ BE100000	๗ ND070002
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000			จ BC100000	ธ BT800000	ศ BS200000	จ BU300000	' BZ100000	๘ ND080002
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000			ฉ BX100000	น BN300000	ช BS300000	จ BU400000	๒ BZ200000	๙ ND090002
-A			* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000			ช BS100000	บ BB100000	ส BS400000	๐ BQ300000	๒ BZ300000	๑ BQ500000
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000			ช BX200000	ป BP100000	ห BH100000	๒ BZ200300	๑ BZ400000	๑ BQ600000
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000			ฅ BX300000	ผ BP200000	ฬ BL300000	๒ BZ300300	๑ BZ500000	๑ SC040000
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000			ฅ BY100000	ผ BF100000	อ BO100000	๑ BZ400300	๑ BN400000	๑ SM660000
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000			ฅ BD100000	พ BP300000	๑ BH200000	๑ BZ500300	๑ BE400000	๑ SM650000
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000				ฅ BT100000	พ BF200000	๑ BQ200000	๑ SC130000	๑ BQ400000	(RSP) SP300000

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OCR-A

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	᠃ SO020000	p LP010000								
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000								
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000		Æ LA520000						
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000								
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000								
-5			% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000		Ñ LN200000						
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000								
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000		Ø LO620000						
-8		— SO150000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000								
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000		Ö LO180000						
-A			* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000		Ü LU180000						
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000								
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SO130000		£ SC020000						
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000		¥ SC050000						
-E			. SP110000	> SA050000	N LN020000	^ SM090000	n LN010000	ſ SO000000	Ä LA180000							
-F			/ SP120000	? SP150000	O LO020000	Ƴ SO010000	o LO010000	■ SO140000	Å LA280000							

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OCR-B

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000								
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	æ LA510000					ß LS610000	
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000		Æ LA520000						
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000								
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000						
-5			% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000			Ñ LN200000					§ SM240000
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	å LA270000		ø LO610000					
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000			Ø LO620000					Š SD410000
-8	— SO150000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000									
-9		) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000		Ö LO180000	— SP090000	ij LI510000					“ SD170000
-A		*SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000		Ü LU180000		Ů LI520000					
-B		+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000		^ SD150000							
-C		, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	l SO130000		£ SC020000							
-D		- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000		¥ SC050000							
-E		. SP110000	> SA050000	N LN020000	^ SM090000	n LN010000	~ SD190000	Ä LA180000								
-F		/ SP120000	? SP150000	O LO020000	_ SD470000	o LO010000	■ SO140000	Å LA280000					☒ SC010000		' SD110000	

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Latin 2 (ISO 8859-2)

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000			(RSP) SP300000	° SM190000	Ř LR120000	Đ LD620000	í LR110000	đ LD610000
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000			Ą LA440000	ą LA430000	Á LA120000	Ñ LN120000	á LA110000	ń LN110000
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000			˘ SD230000	˙ SD430000	Â LA160000	Ň LN220000	â LA150000	ň LN210000
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000			Ł LL620000	ł LL610000	Ǻ LA240000	Ó LO120000	ǻ LA230000	ó LO110000
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000			Ɔ SC010000	' SD110000	Ä LA180000	Ô LO160000	ä LA170000	ô LO150000
-5			% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000			Ĺ LL220000	ĺ LL210000	Ľ LL120000	Ǫ LO260000	í LL110000	ǫ LO250000
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000			Š LS120000	š LS110000	Ć LC120000	Ö LO180000	ć LC110000	ö LO170000
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000			§ SM240000	˘ SD210000	Ç LC420000	×	ç LC410000	÷ SA060000
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000			¨ SD170000	˙ SD410000	Č LC220000	Ř LR220000	č LC210000	ř LR210000
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000			Š LS220000	š LS210000	É LE120000	Û LU280000	é LE110000	û LU270000
-A			* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000			Ş LS420000	ş LS410000	Ę LE440000	Ú LU120000	ę LE430000	ú LU110000
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000			Ť LT220000	ť LT210000	Ě LE180000	Ů LU260000	ě LE170000	ů LU250000
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000			Ž LZ120000	ž LZ110000	Ě LE220000	Ü LU180000	ě LE210000	ü LU170000
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000			(SHY) SP320000	" SD250000	Í LI120000	Ý LY120000	í LI110000	ý LY110000
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000			Ž LZ220000	ž LZ210000	Î LI160000	Ț LT420000	î LI150000	ț LT410000
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000				Ž LZ300000	ž LZ290000	Ǻ LD220000	ß LS610000	ǻ LD210000	· SD290000

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Latin 3 (ISO 8859-3)

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000			(RSP) SP300000	° SM190000	À LA140000		à LA130000	
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000			Ĥ LH620000	ĥ LH610000	Á LA120000	Ñ LN200000	á LA110000	ñ LN190000
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000			˘ SD230000	² ND021000	Â LA160000	Ò LO140000	â LA150000	ò LO130000
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000			£ SC020000	³ ND031000		Ó LO120000		ó LO110000
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000			⌘ SC010000	' SD110000	Ä LA180000	Ô LO160000	ä LA170000	ô LO150000
-5			% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000				μ SM170000	Č LC300000	Ġ LG300000	č LC290000	ġ LG290000
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000			Ĥ LH160000	ĥ LH150000	Ĉ LC160000	Ö LO180000	ĉ LC150000	ö LO170000
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000			§ SM240000	· SD630000	Ç LC420000	×	ç LC410000	÷ SA060000
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000			¨ SD170000	¸ SD410000	È LE140000	Ĉ LG160000	è LE130000	ĝ LG150000
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000			İ LI300000	ı LI610000	É LE120000	Ù LU140000	é LE110000	ù LU130000
-A			* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000			Ş LS420000	ş LS410000	Ê LE160000	Ú LU120000	ê LE150000	ú LU110000
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000			Ǧ LG240000	ǧ LG230000	Ë LE180000	Û LU160000	ë LE170000	û LU150000
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000			Ĵ LJ160000	ĵ LJ150000	Ì LI140000	Ü LU180000	ì LI130000	ü LU170000
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000			(SHY) SP320000	½ NF010000	Í LI120000	Ů LU240000	í LI110000	ů LU230000
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000					Î LI160000	Ŝ LS160000	î LI150000	ș LS150000
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000				Ž LZ300000	ž LZ290000	Ĭ LI180000	ß LS610000	ï LI170000	· SD290000

Code Page 00913

Latin 4 (ISO 8859-4)

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000			(RSP) SP300000	° SM190000	Ā LA320000	Ð LD620000	ā LA310000	đ LD610000
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000			Ą LA440000	ą LA430000	Á LA120000	Ń LN420000	á LA110000	ņ LN410000
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000			Ɔ LK610000	ċ SD430000	Â LA160000	Õ LO320000	â LA150000	ō LO310000
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000			Ŕ LR420000	ŗ LR410000	Ã LA200000	Ų LK420000	ã LA190000	ķ LK410000
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000			Ɔ SC010000	' SD110000	Ä LA180000	Ô LO160000	ä LA170000	ô LO150000
-5			% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000			ĩ LI200000	ĩ LI190000	Å LA280000	Ö LO200000	å LA270000	õ LO190000
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000			Ł LL420000	ł LL410000	Æ LA520000	Ö LO180000	æ LA510000	ö LO170000
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000			§ SM240000	˘ SD210000	Į LI440000	×	į LI430000	÷ SA060000
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000			˙ SD170000	˘ SD410000	Č LC220000	Ø LO620000	č LC210000	ø LO610000
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000			Š LS220000	š LS210000	É LE120000	Ų LU440000	é LE110000	ų LU430000
-A			* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000			Ě LE320000	ě LE310000	Ě LE440000	Ú LU120000	ě LE430000	ú LU110000
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000			Ġ LG420000	ġ LG410000	Ë LE180000	Û LU160000	ë LE170000	û LU150000
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000			Ʀ LT620000	Ʀ LT610000	È LE300000	Ü LU180000	è LE290000	ü LU170000
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000			(SHY) SP320000	Ń LN620000	Í LI120000	Ũ LU200000	í LI110000	ũ LU190000
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000			Ž LZ220000	ž LZ210000	Î LI160000	Ū LU320000	î LI150000	ū LU310000
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000				- SD310000	η LN610000	Ī LI320000	ß LS610000	ī LI310000	· SD290000

Code Page 00914

Cyrillic (ISO 8859-5)

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000			(RSP) SP300000	A KA020000	P KR020000	a KA010000	p KR010000	Nº SM000000
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000			Ё KE180000	Б KB020000	С KS020000	б KB010000	с KS010000	ё KE170000
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000			Ђ KD620000	В KV020000	Т KT020000	в KV010000	т KT010000	ђ KD610000
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000			Ѓ KG120000	Г KG020000	У KU020000	г KG010000	у KU010000	ѓ KG110000
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000			Є KE160000	Д KD020000	Ф KF020000	д KD010000	ф KF010000	є KE150000
-5			% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000			Ѕ KZ160000	Е KE020000	Х KH020000	е KE010000	х KH010000	ѕ KZ150000
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000			І KI120000	Ж KZ220000	Ц KC020000	ж KI110000	ц KC010000	і KI110000
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000			Ї KI180000	З KZ020000	Ч KC220000	з KI170000	ч KC210000	ї KI170000
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000			Ј KJ020000	И KI020000	Ш KS220000	и KI010000	ш KS210000	ј KJ010000
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000			Љ KL420000	Й KJ120000	Щ KS160000	й KJ110000	щ KS150000	љ KL410000
-A			* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000			Њ KN120000	К KK020000	Ъ KU220000	к KK010000	ъ KU210000	њ KN110000
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000			Ћ KC120000	Л KL020000	Ы KY020000	л KL010000	ы KY010000	ћ KC110000
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000			Ќ KK120000	М KM020000	Ь KX120000	м KM010000	ь KX110000	ќ KK110000
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000			(SHY) SP320000	Н KN020000	Э KE140000	н KN010000	э KE130000	§ SM240000
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000			Ў KU240000	О KO020000	Ю KU160000	о KO010000	ю KU150000	ў KU230000
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000				а KG220000	П KP020000	Я KA160000	п KP010000	я KA150000	џ KG210000

Code Page 00915

Latin 8 (ISO 8859-8)

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000			(RSP) SP300000	° SM190000			א HX330000	נ HN010000
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000				± SA020000			ב HB010000	ס HS010000
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000			¢ SC040000	² ND021000			ג HG010000	ע HX350000
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000			£ SC020000	³ ND031000			ד HD010000	ף HP610000
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000			₪ SC010000	' SD110000			ה HH010000	פ HP010000
-5			% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000			¥ SC050000	μ SM170000			ו HW010000	ץ HS610000
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000			! SM650000	¶ SM250000			ז HZ010000	צ HS450000
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000			§ SM240000	● SM570000			ח HH450000	ק HQ010000
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000			¨ SD170000	¸ SD410000			ט HT450000	ך HR010000
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000			© SM520000	¹ ND011000			י HY010000	ש HS210000
-A			* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000			× SA070000	÷ SA060000			ך HK610000	ת HT010000
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000			« SP170000	» SP180000			כ HK010000	
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000			⌋ SM660000	¼ NF040000			ל HL010000	
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000			(SHY) SP320000	½ NF010000			ם HM610000	
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000			® SM530000	¾ NF050000			נ HM010000	
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000				- SM150000			= SM100000	ן HN610000	

Code Page 00916

Latin 5 (ISO 8859-9)

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000			(RSP) SP300000	° SM190000	À LA140000	Ğ LG240000	à LA130000	ğ LG230000
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000			ı SP030000	± SA020000	Á LA120000	Ñ LN200000	á LA110000	ñ LN190000
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000			¢ SC040000	² ND021000	Â LA160000	Ò LO140000	â LA150000	ò LO130000
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000			£ SC020000	³ ND031000	Ã LA200000	Ó LO120000	ã LA190000	ó LO110000
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000			¤ SC010000	' SD110000	Ä LA180000	Ô LO160000	ä LA170000	ô LO150000
-5			% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000			¥ SC050000	μ SM170000	Å LA280000	Ö LO200000	å LA270000	ö LO190000
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000			! SM650000	¶ SM250000	Æ LA520000	Ö LO180000	æ LA510000	ö LO170000
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000			§ SM240000	· SD630000	Ç LC420000	×	ç LC410000	÷ SA060000
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000			¨ SD170000	¸ SD410000	È LE140000	Ø LO620000	è LE130000	ø LO610000
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000			© SM520000	¹ ND011000	É LE120000	Ù LU140000	é LE110000	ù LU130000
-A			* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000			ª SM210000	º SM200000	Ê LE160000	Ú LU120000	ê LE150000	ú LU110000
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000			« SP170000	» SP180000	Ë LE180000	Û LU160000	ë LE170000	û LU150000
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000			¬ SM660000	¼ NF040000	Ì LI140000	Ü LU180000	ì LI130000	ü LU170000
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000			(SHY) SP320000	½ NF010000	Í LI120000	İ LI300000	í LI110000	ı LI610000
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000			® SM530000	¾ NF050000	Î LI160000	Ş LS420000	î LI150000	ş LS410000
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000				™ SM150000	¿ SP160000	Ï LI180000	ß LS610000	ï LI170000	ÿ LY170000

Code Page 00920

Baltic Multilingual

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000			(RSP) SP300000	° SM190000	Ą LA440000	Š LS220000	ą LA430000	š LS210000
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000			” SP220000	± SA020000	Į LI440000	Ń LN120000	ì LI430000	ń LN110000
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000			¢ SC040000	² ND021000	Ā LA320000	Ņ LN420000	ā LA310000	ņ LN410000
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000			£ SC020000	³ ND031000	Č LC120000	Ó LO120000	ć LC110000	ó LO110000
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000			¤ SC010000	“ SP210000	Ä LA180000	Ö LO320000	ä LA170000	ö LO310000
-5			% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000			„ SP230000	μ SM170000	Å LA280000	Õ LO200000	å LA270000	õ LO190000
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000			¡ SM650000	¶ SM250000	Ę LE440000	Ö LO180000	ę LE430000	ö LO170000
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000			§ SM240000	• SD630000	Ē LE320000	×	ē SA070000	÷ SA060000
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000			Ø LO620000	ø LO610000	Č LC220000	Ů LU440000	č LC210000	ů LU430000
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000			© SM520000	¹ ND011000	É LE120000	Ł LL620000	é LE110000	ł LL610000
-A			* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000			Ŕ LR420000	ŗ LR410000	Ž LZ120000	Ś LS120000	ż LZ110000	ś LS110000
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000			« SP170000	» SP180000	È LE300000	Ū LU320000	è LE290000	ū LU310000
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000			¬ SM660000	¼ NF040000	Ģ LG420000	Ü LU180000	ģ LG410000	ü LU170000
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000			(SHY) SP320000	½ NF010000	ķ LK420000	Ž LZ300000	ķ LK410000	ž LZ290000
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000			® SM530000	¾ NF050000	Ī LI320000	Ž LZ220000	ī LI310000	ž LZ210000
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000				Æ LA520000	æ LA510000	Ł LL420000	ß LS610000	ł LL410000	’ SP200000

Code Page 00921

Estonian

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000			(RSP) SP300000	° SM190000	À LA140000	Š LS220000	à LA130000	š LS210000
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000			ı SP030000	± SA020000	Á LA120000	Ñ LN200000	á LA110000	ñ LN190000
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000			¢ SC040000	² ND021000	Â LA160000	Ò LO140000	â LA150000	ò LO130000
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000			£ SC020000	³ ND031000	Ã LA200000	Ó LO120000	ã LA190000	ó LO110000
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000			¤ SC010000	' SD110000	Ä LA180000	Ô LO160000	ä LA170000	ô LO150000
-5			% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000			¥ SC050000	µ SM170000	Å LA280000	Õ LO200000	å LA270000	õ LO190000
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000			¦ SM650000	¶ SM250000	Æ LA520000	Ö LO180000	æ LA510000	ö LO170000
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000			§ SM240000	· SD630000	Ç LC420000	×	ç SA070000	÷ SA060000
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000			¨ SD170000	¸ SD410000	È LE140000	Ø LO620000	è LE130000	ø LO610000
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000			© SM520000	¹ ND011000	É LE120000	Ù LU140000	é LE110000	ù LU130000
-A			* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000			ª SM210000	º SM200000	Ê LE160000	Ú LU120000	ê LE150000	ú LU110000
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000			« SP170000	» SP180000	Ë LE180000	Û LU160000	ë LE170000	û LU150000
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000			¬ SM660000	¼ NF040000	Ì LI140000	Ü LU180000	ì LI130000	ü LU170000
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000			(SHY) SP320000	½ NF010000	Í LI120000	Ý LY120000	í LI110000	ý LY110000
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000			® SM530000	¾ NF050000	Î LI160000	Ž LZ220000	î LI150000	ž LZ210000
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000				¯ SM150000	¿ SP160000	Ĭ LI180000	ß LS610000	ï LI170000	ÿ LY170000

Code Page 00922

Latin 9 (ISO 8859-15) + euro

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →																
2ND ↓																
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000			(RSP) SP300000	° SM190000	À LA140000	Ð LD640000	à LA130000	ð LD630000
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000			ì SP030000	± SA020000	Á LA120000	Ñ LN200000	á LA110000	ñ LN190000
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000			¢ SC040000	² ND021000	Â LA160000	Ò LO140000	â LA150000	ò LO130000
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000			£ SC020000	³ ND031000	Ã LA200000	Ó LO120000	ã LA190000	ó LO110000
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000			€ SC200000	Ž LZ220000	Ä LA180000	Ô LO160000	ä LA170000	ô LO150000
-5			% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000			¥ SC050000	μ SM170000	Å LA280000	Õ LO200000	å LA270000	õ LO190000
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000			Š LS220000	¶ SM250000	Æ LA520000	Ö LO180000	æ LA510000	ö LO170000
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000			§ SM240000	· SD630000	Ç LC420000	×	ç LC410000	÷ SA060000
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000			š LS210000	ž LZ210000	È LE140000	Ø LO620000	è LE130000	ø LO610000
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000			© SM520000	¹ ND011000	É LE120000	Ù LU140000	é LE110000	ù LU130000
-A			* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000			ª SM210000	º SM200000	Ê LE160000	Ú LU120000	ê LE150000	ú LU110000
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000			« SP170000	» SP180000	Ë LE180000	Û LU160000	ë LE170000	û LU150000
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000			¬ SM660000	Œ LO520000	Ì LI140000	Ü LU180000	ì LI130000	ü LU170000
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000			(SHY) SP320000	œ LO510000	Í LI200000	Ý LY120000	í LI110000	ý LY110000
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000			® SM530000	ÿ LY180000	Î LI160000	Þ LT640000	î LI150000	þ LT630000
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000				- SD310000	¿ SP160000	İ LI180000	ß LS610000	ï LI170000	ÿ LY170000

Code Page 00923

Urdu

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000			(RSP) SP300000	ا AA010000	چ AC210000	ش AS230003	ف AF010003	و AW010000
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000			• ND100001	ل AA010002	چ AC210003	ص AS450006	ق AQ010000	ہ AH020000
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000			ا ND010001	ل AA010006	ح AH450000	ص AS450003	ق AQ010003	ہ AH020003
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000			۶ ND020001	ب AB010000	ح AH450003	ض AD450006	ک AK010006	ہ AH020004
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000			۳ ND030001	ب AB010003	خ AH470000	ض AD450003	ک AK010003	ہ AH030000
-5			% SM020007	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000			۴ ND040004	پ AP010000	خ AH470003	ط AT450000	گ AG010000	ء AX300000
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000			۵ ND050004	پ AP010003	د AD010000	ظ AZ450000	گ AG010003	ع AY320000
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000			۶ ND060001	ة AT020000	ڈ AD030000	ع AC470000	ل AL010000	ع AY320002
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000			۷ ND070004	ت AT010000	ذ AD470000	ع AC470002	ل AL010006	ع AY320003
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000			۸ ND080001	ت AT010003	ر AR010000	ع AC470003	ل AL010004	ی AY020000
-A			* SM040007	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000			۹ ND090001	ٹ AT030000	ڑ AR030000	ع AC470004	م AM010000	ی AY020002
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000			، SP080007	ٹ AT030003	ز AZ010000	غ AG310000	م AM010003	پ AY020003
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000			؛ SP140007	ٹ AT470000	ژ AZ210000	غ AG310002	ن AN020000	ع AY340000
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000			(SHY) SP320000	ث AT470003	س AS010006	غ AG310003	ن AN010000	ع AY040000
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000			؟ SP150007	ج AG230000	س AS010003	غ AG310004	ن AN010003	ع AX100000
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000				آ AA210000	ج AG230003	ش AS230006	ف AF010000	ؤ AW310000	ع AX100004

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Arabic Extended

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	ل AA310402	ع AU050004	(RSP) SP300000	• ND100001	ع AC470003	ذ AD470000	ـ SM860000	َ AI050000
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	× SA070000	= AI050004	آ AA210006	ا ND010001	ء AX300000	ر AR010000	ف AF010000	س AX100000
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	÷ SA060000	و AX100004	ؤ AA310006	ة ND020001	آ AA210000	ز AZ010000	ق AQ010000	ه AE050000
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	سر AS010000	ه AE050004	ل AA310406	ة ND030001	أ AA310000	س AS010006	ك AK010000	ق AQ010003
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	شر AS230000	= AA050004	ڤ SC010000	ة ND040001	ؤ AW310000	ش AS230006	ل AL010000	ك AK010003
-5			% SM020007	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	ص AS450000	ء AY310002	ل AA010006	ه ND050001	ا AA310400	ص AS450006	م AM010000	ل AL010003
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	ض AD450000	ى AA020002	ث AY310000	ة ND060001	ء AY310006	ض AD450006	ن AN010000	ل SM870000
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ء AA070004	ي AY010003	ب AB010003	ة ND070001	ا AA010000	ط AT450000	ه AH010003	ل AL220000
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000		ي AY010002	ت AT010003	ة ND080001	ب AB010000	ظ AZ450000	و AW010000	ل AL320000
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	■ SM470000	غ AG310002	ث AT470003	ة ND090001	ة AT020000	ع AC470000	ى AA020000	ل AL320400
-A			* SM040007	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	⌈ SF110000	غ AG310003	ج AG230003	ش AS230003	ت AT010000	غ AG310000	ي AY010000	لا AL020000
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	⌋ SF100000	خ AG310004	ح AH450003	؛ SP140007	ث AT470000	ع AC470004	ل AA070000	م AM010003
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	⌋ SF030000	ل AL220003	، SP080007	ص AS450003	ج AG230000	آ AA210002	ل AU070000	ن AN010003
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	⌋ SF010000	ل AL320003	(SHY) SP320000	ض AD450003	ح AH450000	أ AA310002	ل AI070000	ل AH010004
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	⌋ SF020000	ل AL320402	خ AH470003	ع AC470002	خ AH470000	ا AA010002	ل AA050000	ه AH010000
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000		⌋ SF040000	ل AL020003	س AS010003	؟ SP150007	د AD010000	ف AF010003	ع AU050000	

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Latin 6 (ISO 8859-6)

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000			(RSP) SP300000			ذ AD470009	ـ SM860000	َ AI050009
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000					ء AX300009	ر AR010009	ف AF010009	و AX100009
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000					آ AA210009	ز AZ010009	ق AQ010009	ه AE050009
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000					أ AA310009	س AS010009	ك AK010009	
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000			ؐ SC010000		ؤ AW310009	ش AS230009	ل AL010009	
-5			% SM020007	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000					إ AA310409	ص AS450009	م AM010009	
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000					ى AY310009	ض AD450009	ن AN010009	
-7			' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000					ا AA010009	ط AT450009	ه AH010009	
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000					ب AB010009	ظ AZ450009	و AW010009	
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000					ة AT020009	ع AC470009	ى AA020009	
-A			* SM040007	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000					ت AT010009	غ AG310009	ي AY010009	
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000				؛ SP140007	ث AT470009		ف AA070009	
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000			، SP080007		ج AG230009		ك AU070009	
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000			(SHY) SP320000		ح AH450009		ف AI070009	
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000					خ AH470009		ـ AA050009	
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000					؟ SP150007	د AD010009		ـ AU050009	

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Farsi (Personal Computer)

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		▶	(SP)	0	@	P	`	p		ؤ	ح			ع	ک	(SHY)
		SM590000	SP010000	ND100000	SM050000	LP020000	SD130000	LP010000		AW310000	AH450003	SF140000	SF020000	AC470002	AK010006	SP320000
-1	☺	◀	!	1	A	Q	a	q		ء	خ			ء	ک	ی
	SS000000	SM630000	SP020000	ND010000	LA020000	LQ020000	LA010000	LQ010000		AY320003	AH470000	SF150000	SF070000	AC470003	AK010003	AY020002
-2	☹	↕	"	2	B	R	b	r	،	ب	ذ			ع	گ	پ
	SS010000	SM760000	SP040000	ND020000	LB020000	LR020000	LB010000	LR010000	SP080007	AB010000	AH470003	SF160000	SF060000	AC470004	AG010000	AY020003
-3	♥	!!	#	3	C	S	c	s	؛	ب	د			غ	گ	ـ
	SS020000	SP330000	SM010000	ND030000	LC020000	LS020000	LC010000	LS010000	SP140007	AB010003	AD010000	SF110000	SF080000	AG310000	AG010003	SM860000
-4	♦	¶	\$	4	D	T	d	t	؟	پ	ذ			غ	ل	ه
	SS030000	SM250000	SC030000	ND040000	LD020000	LT020000	LD010000	LT010000	SP150007	AP010000	AD470000	SF090000	SF100000	AG310002	AL010000	ND100003
-5	♣	§	%	5	E	U	e	u	’	پ	ر	ض		غ	ل	ا
	SS040000	SM240000	SM020007	ND050000	LE020000	LU020000	LE010000	LU010000	AA070009	AP010003	AR010000	AD450006	SF050000	AG310003	AL010003	ND010001
-6	♠	■	&	6	F	V	f	v	آ	ت	ز	ض	ظ	غ	م	آ
	SS050000	SM700000	SM030000	ND060000	LF020000	LV020000	LF010000	LV010000	AA210000	AT010000	AZ010000	AD450003	AZ450002	AG310004	AM010000	ND020001
-7	●	↕	’	7	G	W	g	w	آ	ت	ژ	ط	ع	ف	م	۳
	SM570000	SM770000	SP050000	ND070000	LG020000	LW020000	LG010000	LW010000	AA210002	AT010003	AZ210000	AT450001	AC470000	AF010000	AM010003	ND030001
-8	■	↑	(	8	H	X	h	x	آ	ث	س	ط		ف	ن	۴
	SM570001	SM320000	SP060000	ND080000	LH020000	LX020000	LH010000	LX010000	AA210006	AT470000	AS010006	AT450002	SF380000	AF010003	AN010000	ND040003
-9	○	↓	)	9	I	Y	i	y	ا	ث	سد			ن	۵	
	SM750000	SM330000	SP070000	ND090000	LI020000	LY020000	LI010000	LY010000	AA010000	AT470003	AS010003	SF230000	SF390000	SF040000	AN010003	ND050004
-A	●	→	*	:	J	Z	j	z	ا	ج	ش			و	۶	
	SM750002	SM310000	SM040007	SP130000	LJ020000	LZ020000	LJ010000	LZ010000	AA010002	AG230000	AS230006	SF240000	SF400000	SF010000	AW010000	ND060003
-B	♂	←	+	;	K	[	k	{	ا	چ	ش			ه	۷	
	SM280000	SM300000	SA010000	SP140000	LK020000	SM060000	LK010000	SM110000	AA010006	AG230003	AS230003	SF250000	SF410000	SF610000	AH010000	ND070001
-C	♀	⌞	,	<	L	\	l	|	ء	چ	ص			ه	۸	
	SM290000	SA420000	SP080000	SA030000	LL020000	SM070000	LL010000	SM130000	AX300000	AC210000	AS450006	SF260000	SF420000	SF570000	AH010003	ND080001
-D	♪	↔	-	=	M	]	m	}	ا	چ	ص			ق	۹	
	SM930000	SM780000	SP100000	SA040000	LM020000	SM080000	LM010000	SM140000	AA310000	AC210003	AS450003	SC160000	SF430000	AQ010000	AH010004	ND090001
-E	♪	▲	.	>	N	^	n	~	ا	×	«	ظ		ق	۰	■
	SM910000	SM600000	SP110000	SA050000	LN020000	SD150000	LN010000	SD190000	AA310002	SA070000	SP170000	AZ450001	SF440000	AQ010003	AH210000	SM470000
-F	☀	▼	/	?	O	_	o	□	ا	ح	»			ی	(RSP)	
	SM690000	SV040000	SP120000	SP150000	LO020000	SP090000	LO010000	SM790000	AA310006	AH450000	SP180000	SF030000		SF600000	AY020000	SP300000

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Estonian (Personal Computer)

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		▶ SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	á LA110000	☐ SF140000	☐ SF020000	š LS210000	Ó LO120000	(SHY) SP320000
-1	☺ SS000000	◀ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	æ LA510000	í LI110000	☐ SF150000	☐ SF070000	Š LS220000	ß LS610000	± SA020000
-2	☹ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Æ LA520000	ó LO110000	☐ SF160000	☐ SF080000	Ê LE160000	Ô LO160000	= SM100000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	☐ SF110000	☐ SF090000	Ë LE180000	Ò LO140000	¾ NF050000
-4	♦ SS030000	¶ SM250000	\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	ñ LN190000	☐ SF090000	☐ SF100000	È LE140000	õ LO190000	¶ SM250000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	ò LO130000	Ñ LN200000	Á LA120000	☐ SF050000	ı LI610000	Õ LO200000	§ SM240000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	å LA270000	û LU150000	ä SM210000	Â LA160000	ã LA190000	Í LI120000	μ SM170000	÷ SA060000
-7	• SM570000	↕ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	ù LU130000	º SM200000	À LA140000	Ã LA200000	Î LI160000	ž LZ210000	˘ SD410000
-8	◼ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	ÿ LY170000	ı SP160000	© SM520000	☐ SF380000	İ LI180000	Ž LZ220000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	® SM530000	☐ SF230000	☐ SF390000	☐ SF040000	Ú LU120000	˙ SD170000
-A	◐ SM750002	→ SM310000	* SM040000	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	¬ SM660000	☐ SF240000	☐ SF400000	☐ SF010000	Û LU160000	• SD630000
-B	♂ SM280000	← SM300000	÷ SA010000	;	K LK020000	[SM060000	k LK010000	{ SM110000	ï LI170000	ø LO610000	½ NF010000	☐ SF250000	☐ SF410000	☐ SF610000	Ü LU140000	¹ ND011000
-C	♀ SM290000	└ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	£ SC020000	¼ NF040000	☐ SF260000	☐ SF420000	☐ SF570000	Ý LY110000	³ ND031000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	ì LI130000	Ø LO620000	ı SP030000	¢ SC040000	☐ SF430000	☐ SM650000	Ý LY120000	² ND021000
-E	♪ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	×	« SP170000	¥ SC050000	☐ SF440000	İ LI140000	ˉ SM150000	■ SM470000
-F	☀ SM690000	▼ SV040000	/ SP150000	? SP150000	O LO020000	_ SP090000	o LO010000	◻ SM790000	Å LA280000	f SC070000	» SP180000	☐ SF030000	☐ SC010000	☐ SF600000	' SD110000	(RSP) SP300000

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Latvian (Personal Computer)

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		▶	(SP)	0	@	P	`	p	Č	É	Ā				Ó	(SHY)
		SM590000	SP010000	ND100000	SM050000	LP020000	SD130000	LP010000	LC120000	LE120000	LA320000	SF140000	SF020000	SF460000	LO120000	SP320000
-1	☺	◀	!	1	A	Q	a	q	ü	Ž	Ī				ß	±
	SS000000	SM630000	SP020000	ND010000	LA020000	LQ020000	LA010000	LQ010000	LU170000	LZ300000	LI320000	SF150000	SF070000	SF470000	LS610000	SA020000
-2	☹	↕	"	2	B	R	b	r	é	ž	ó				Ō	æ
	SS010000	SM760000	SP040000	ND020000	LB020000	LR020000	LB010000	LR010000	LE110000	LZ290000	LO110000	SF160000	SF060000	SF480000	LO320000	LA510000
-3	♥	!!	#	3	C	S	c	s	ā	ō	ų				Ń	Æ
	SS020000	SP330000	SM010000	ND030000	LC020000	LS020000	LC010000	LS010000	LA310000	LO310000	LU430000	SF110000	SF080000	SF490000	LN120000	LA520000
-4	♦	¶	\$	4	D	T	d	t	ä	ö	Ą				ö	¶
	SS030000	SM250000	SC030000	ND040000	LD020000	LT020000	LD010000	LT010000	LA170000	LO170000	LA440000	SF090000	SF100000	SF500000	LO190000	SM250000
-5	♣	§	%	5	E	U	e	u	ġ	Ġ	ą				Œ	œ
	SS040000	SM240000	SM020000	ND050000	LE020000	LU020000	LE010000	LU010000	LG410000	LG420000	LA430000	SF190000	SF050000	SF510000	LO200000	SC010000
-6	♠	—	&	6	F	V	f	v	ā	ū	Ž				Š	÷
	SS050000	SM700000	SM030000	ND060000	LF020000	LV020000	LF010000	LV010000	LA270000	LU310000	LZ220000	SF200000	SF360000	SF520000	LS220000	SA060000
-7	●	↕	'	7	G	W	g	w	ć	ś	ž				š	ø
	SM570000	SM770000	SP050000	ND070000	LG020000	LW020000	LG010000	LW010000	LC110000	LS120000	LZ210000	SF210000	SF370000	SF530000	LS210000	LO610000
-8	■	↑	(	8	H	X	h	x	ł	ś	Ę				Œ	°
	SM570001	SM320000	SP060000	ND080000	LH020000	LX020000	LH010000	LX010000	LL610000	LS110000	LE440000	SF220000	SF380000	SF540000	LK420000	SM190000
-9	○	↓	)	9	I	Y	i	y	ē	Ö	ę				ķ	Ø
	SM750000	SM330000	SP070000	ND090000	LI020000	LY020000	LI010000	LY010000	LE310000	LO180000	LE430000	SF230000	SF390000	SF040000	LK410000	LO620000
-A	⦿	→	*	:	J	Z	j	z	è	Ü	È				Ū	·
	SM750002	SM310000	SM040000	SP130000	LJ020000	LZ020000	LJ010000	LZ010000	LE290000	LU180000	LE300000	SF240000	SF400000	SF010000	LU320000	SD630000
-B	♂	←	+	;	K	[	k	{	ì	ń	ź				Ū	ı
	SM280000	SM300000	SA010000	SP140000	LK020000	SM060000	LK010000	SM110000	LI430000	LN110000	LZ110000	SF250000	SF410000	SF610000	LU440000	LR410000
-C	♀	└	,	<	L	\	l	|	ī	Ļ	Č				Ļ	Ŕ
	SM290000	SA420000	SP080000	SA030000	LL020000	SM070000	LL010000	SM130000	LI310000	LL420000	LC220000	SF260000	SF420000	SF570000	LL410000	LR420000
-D	♪	↔	-	=	M	]	m	}	Ž	Ł	Į				Ē	„
	SM930000	SM780000	SP100000	SA040000	LM020000	SM080000	LM010000	SM140000	LZ120000	LL620000	LI440000	SF270000	SF430000	SF580000	LE320000	SP230000
-E	🎵	▲	.	>	N	^	n	~	Ä	×	«				Ņ	“
	SM910000	SM600000	SP110000	SA050000	LN020000	SD150000	LN010000	SD190000	LA180000	SA070000	SP170000	SF280000	SF440000	SF590000	LN420000	SP210000
-F	☀	▼	/	?	O	_	o		Å	č	»				ņ	(RSP)
	SM690000	SV040000	SP120000	SP150000	LO020000	SP090000	LO010000		LA280000	LC210000	SP180000	SF030000	SF450000	SF600000	LN410000	SP300000

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Lithuanian (Personal Computer)

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		▶ SM590000	(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ç LC420000	É LE120000	á LA110000	☐ SF140000	☐ SF020000	ą LA430000	α GA010000	≡ SA480000
-1	☺ SS000000	◀ SM630000	! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000	ü LU170000	æ LA510000	í LI110000	☐ SF150000	☐ SF070000	č LC210000	β GB010000	± SA020000
-2	☹ SS010000	↕ SM760000	" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	é LE110000	Æ LA520000	ó LO110000	☐ SF160000	☐ SF060000	ę LE430000	Γ GG020000	≥ SA530000
-3	♥ SS020000	!! SP330000	# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000	â LA150000	ô LO150000	ú LU110000	☐ SF110000	☐ SF080000	è LE290000	π GP010000	≤ SA520000
-4	♦ SS030000	¶ SM250000	\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	ä LA170000	ö LO170000	ñ LN190000	☐ SF090000	☐ SF100000	ì LI430000	Σ GS020000	„ SP230000
-5	♣ SS040000	§ SM240000	% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	à LA130000	ò LO130000	Ñ LN200000	A LA440000	☐ SF050000	š LS210000	σ GS010000	“ SP210000
-6	♠ SS050000	▬ SM700000	& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	å LA270000	û LU150000	ä SM210000	Č LC220000	Ų LU440000	ų LU430000	μ SM170000	÷ SA060000
-7	● SM570000	↕ SM770000	' SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	ç LC410000	ù LU130000	º SM200000	Ę LE440000	Ū LU320000	ū LU310000	τ GT010000	≈ SA700000
-8	◼ SM570001	↑ SM320000	(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000	ê LE150000	ÿ LY170000	ı SP160000	Ê LE300000	☐ SF380000	ž LZ210000	Φ GF020000	° SM190000
-9	○ SM750000	↓ SM330000	) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	ë LE170000	Ö LO180000	┐ SM680000	☐ SF230000	☐ SF390000	☐ SF040000	Θ GT620000	• SA790000
-A	◐ SM750002	→ SM310000	* SM040000	:	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	è LE130000	Ü LU180000	┐ SM660000	☐ SF240000	☐ SF400000	☐ SF010000	Ω GO320000	· SD290000
-B	♂ SM280000	← SM300000	+ SA010000	;	K LK020000	[SM060000	k LK010000	{ SM110000	ï LI170000	¢ SC040000	½ NF010000	☐ SF250000	☐ SF410000	☐ SF610000	δ GD010000	✓ SA800000
-C	♀ SM290000	└ SA420000	, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	î LI150000	£ SC020000	¼ NF040000	☐ SF260000	☐ SF420000	☐ SF570000	∞ SA450000	ⁿ LN011000
-D	♪ SM930000	↔ SM780000	- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	ì LI130000	¥ SC050000	ı SP030000	İ LI440000	☐ SF430000	☐ SF580000	φ GF010000	² ND021000
-E	♪ SM910000	▲ SM600000	. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ä LA180000	Pts SC060000	« SP170000	Š LS220000	☐ SF440000	☐ SF590000	ε GE010000	■ SM470000
-F	☀ SM690000	▼ SV040000	/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000	☐ SM790000	Å LA280000	f SC070000	» SP180000	☐ SF030000	Ž LZ220000	☐ SF600000	∩ SA140000	(RSP) SP300000

Code Page 01118

Central Europe Latin 2

HEX DIGITS 1ST → 2ND ↓	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	€ SC200000		(RSP) SP300000	° SM190000	Ř LR120000	Đ LD600000	í LR110000	đ LD610000
-1			! SP020000	1 ND010000	A LA020000	Q LQ020000	a LA010000	q LQ010000		‘ SP190000	√ SD210000	± SA020000	Á LA120000	Ñ LN120000	á LA110000	ñ LN110000
-2			" SP040000	2 ND020000	B LB020000	R LR020000	b LB010000	r LR010000	, SP260000	’ SP200000	˘ SD230000	˘ SD430000	Â LA160000	Ň LN220000	â LA150000	ň LN210000
-3			# SM010000	3 ND030000	C LC020000	S LS020000	c LC010000	s LS010000		“ SP210000	Ł LL620000	ł LL610000	Ǻ LA240000	Ó LO120000	ǻ LA230000	ó LO110000
-4			\$ SC030000	4 ND040000	D LD020000	T LT020000	d LD010000	t LT010000	„ SP230000	” SP220000	☒ SC010000	’ SD110000	Ä LA180000	Ô LO160000	ä LA170000	ô LO150000
-5			% SM020000	5 ND050000	E LE020000	U LU020000	e LE010000	u LU010000	... SV520000	● SM570000	Å LA440000	μ SM170000	Ĺ LL120000	Õ LO260000	Í LI110000	õ LO250000
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	† SM340000	– SS680000	| SM650000	¶ SM250000	Č LC120000	Ö LO180000	č LC110000	ö LO170000
-7			’ SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	‡ SM350000	— SM900000	§ SM240000	• SD630000	Ç LC420000	×	ç SA070000	÷ SA060000
-8			(SP060000	8 ND080000	H LH020000	X LX020000	h LH010000	x LX010000			“ SD170000	’ SD410000	Č LC220000	Ř LR220000	č LC210000	ř LR210000
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	‰ SM560000	™ SM540000	© SM520000	ą LA430000	É LE120000	Û LU280000	é LE110000	ű LU270000
-A			* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	Š LS220000	š LS210000	Ş LS420000	ş LS410000	Ě LE440000	Ú LU120000	ě LE430000	ú LU110000
-B			+ SA010000	; SP140000	K LK020000	[SM060000	k LK010000	{ SM110000	< SP270000	> SP280000	« SP170000	» SP180000	Ě LE180000	Ů LU260000	ě LE170000	ů LU250000
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	Š LS120000	ś LS110000	⌌ SM660000	Ĺ LL220000	Ě LE220000	Ü LU180000	č LE210000	ü LU170000
-D			- SP100000	= SA040000	M LM020000	] SM080000	m LM010000	} SM140000	Ť LT220000	ť LT210000	(SHY) SP320000	” SD250000	Í LI120000	Ý LY120000	í LI110000	ý LY110000
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Ž LZ220000	ž LZ210000	® SM530000	Ĭ LL210000	Î LI160000	Ť LT420000	î LI150000	ț LT410000
-F			/ SP120000	? SP150000	O LO020000	_ SP090000	o LO010000		Ž LZ120000	ž LZ110000	Ž LZ300000	ž LZ290000	Ď LD220000	ß LS610000	ď LD210000	· SD290000

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Cyrillic Windows + euro

HEX DIGITS	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
1ST →																
2ND ↓																
-0			(SP) SP010000	0 ND100000	@ SM050000	P LP020000	` SD130000	p LP010000	Ђ KD620000	ђ KD610000	(RSP) SP300000	° SM190000	А KA020000	Р KR020000	а KA010000	р KR010000
-1			! SP020000	1 ND010000	А LA020000	Q LQ020000	a LA010000	q LQ010000	ѓ KG120000	‘ SP190000	Ў KU240000	± SA020000	Б KB020000	С KS020000	б KB010000	с KS010000
-2			" SP040000	2 ND020000	В LB020000	R LR020000	b LB010000	r LR010000	, SP260000	’ SP200000	ѣ KU230000	І KI120000	В KV020000	Т KT020000	в KV010000	т KT010000
-3			# SM010000	3 ND030000	С LC020000	S LS020000	c LC010000	s LS010000	ѓ KG110000	“ SP210000	Ј KJ020000	і KI110000	Г KG020000	У KU020000	г KG010000	у KU010000
-4			\$ SC030000	4 ND040000	Д LD020000	T LT020000	d LD010000	t LT010000	„ SP230000	” SP220000	Ќ SC010000	г KG290000	Д KD020000	Ф KF020000	д KD010000	ф KF010000
-5			% SM020000	5 ND050000	Е LE020000	U LU020000	e LE010000	u LU010000	... SV520000	● SM570000	Г KG300000	μ SM170000	Е KE020000	Х KH020000	е KE010000	х KH010000
-6			& SM030000	6 ND060000	F LF020000	V LV020000	f LF010000	v LV010000	† SM340000	— SS680000	Ї SM650000	¶ SM250000	Ж KZ220000	Ц KC020000	ж KZ210000	ц KC010000
-7			’ SP050000	7 ND070000	G LG020000	W LW020000	g LG010000	w LW010000	‡ SM350000	— SM900000	§ SM240000	• SD630000	З KZ020000	Ч KC220000	з KZ010000	ч KC210000
-8			(SP060000	8 ND080000	Н LH020000	X LX020000	h LH010000	x LX010000	€ SC200000		Ё KE180000	ё KE170000	И KI020000	Ш KS220000	и KI010000	ш KS210000
-9			) SP070000	9 ND090000	I LI020000	Y LY020000	i LI010000	y LY010000	‰ SM560000	™ SM540000	© SM520000	№ SM000000	Й KJ120000	Щ KS160000	й KJ110000	щ KS150000
-A			* SM040000	: SP130000	J LJ020000	Z LZ020000	j LJ010000	z LZ010000	Љ KL420000	љ KL410000	Є KE160000	є KE150000	К KK020000	Ъ KU220000	к KK010000	ъ KU210000
-B			+ SA010000	; SP140000	К LK020000	[SM060000	k LK010000	{ SM110000	< SP270000	> SP280000	« SP170000	» SP180000	Л KL020000	Ы KY020000	л KL010000	ы KY010000
-C			, SP080000	< SA030000	L LL020000	\ SM070000	l LL010000	| SM130000	Нь KN120000	њ KN110000	ѣ SM660000	ј KJ010000	М KM020000	Ь KX120000	м KM010000	ь KX110000
-D			- SP100000	= SA040000	М LM020000	] SM080000	m LM010000	} SM140000	Њ KK120000	њ KK110000	(SRY) SP320000	Ѕ KZ160000	Н KN020000	Э KE140000	н KN010000	э KE130000
-E			. SP110000	> SA050000	N LN020000	^ SD150000	n LN010000	~ SD190000	Њ KC120000	њ KC110000	® SM530000	ѕ KZ150000	О KO020000	Ю KU160000	о KO010000	ю KU150000
-F			/ SP120000	? SP150000	О LO020000	_ SP090000	о LO010000		Џ KG220000	џ KG210000	Ї KI180000	ї KI170000	П KP020000	Я KA160000	п KP010000	я KA150000

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Epson FX-series Code Pages

The following Epson code charts provide information on the character tables available for Epson FX-series emulation mode.

Extended Graphics Character Table

Table 10.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			sp	0	@	P	'	p	Ç	É	á	⌘	ℒ	⌚	α	≡
1			1	1	A	Q	a	q	ü	æ	í	⋮	⊥	⌞	β	±
2			"	2	B	R	b	r	é	Æ	ó	⌘	⌞	⌞	Γ	≥
3			#	3	C	S	c	s	â	ô	ú	|	⌞	⌚	π	≤
4			\$	4	D	T	d	t	ä	ö	ñ	⌞	—	ℓ	Σ	∫
5			%	5	E	U	e	u	à	ò	Ñ	⌞	⌞	ℱ	σ	∫
6			&	6	F	V	f	v	â	û	ª	⌞	⌞	π	μ	÷
7			'	7	G	W	g	w	ç	ù	º	⌞	⌞	⌞	τ	≈
8			(	8	H	X	h	x	ê	ÿ	¿	⌞	⌞	⌞	φ	°
9			)	9	I	Y	i	y	ë	Ö	¬	⌞	⌞	⌞	θ	●
A			*	:	J	Z	j	z	è	Ü	¬	⌞	⌞	⌞	Ω	•
B			+	;	K	[	k	{	ï	ø	½	⌞	⌞	⌞	δ	√
C			,	<	L	\	l	¡	î	£	¼	⌞	⌞	⌞	∞	ⁿ
D			-	=	M	]	m	}	ì	¥	¡	⌞	=	⌞	φ	²
E			.	>	N	^	n	~	Ä	ℙ	≪	⌞	⌞	⌞	€	■
F			/	?	O	_	o		Å	f	≫	⌞	⌞	⌞	∩	∅

Italic Character Table

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			sp	0	@	P	'	p				0	@	P	'	p
1			!	1	A	Q	a	q			!	1	A	Q	a	q
2			"	2	B	R	b	r			"	2	B	R	b	r
3			#	3	C	S	c	s			#	3	C	S	c	s
4			\$	4	D	T	d	t			\$	4	D	T	d	t
5			%	5	E	U	e	u			%	5	E	U	e	u
6			&	6	F	V	f	v			&	6	F	V	f	v
7			'	7	G	W	g	w			'	7	G	W	g	w
8			(	8	H	X	h	x			(	8	H	X	h	x
9			)	9	I	Y	i	y			)	9	I	Y	i	y
A			*	:	J	Z	j	z			*	:	J	Z	j	z
B			+	;	K	[	k	{			+	;	K	[	k	{
C			,	<	L	\	l	|			,	<	L	\	l	|
D			-	=	M	]	m	}			-	=	M	]	m	}
E			.	>	N	^	n	~			.	>	N	^	n	~
F			/	?	O	_	o				/	?	O	_	o	{

Epson Extended Character Variables

The following table shows characters that vary, by language, from the Epson Extended Character Graphics set.

The code points shown are the only ones that vary. For example, in the United Kingdom, only code point X'23' is different from the basic Epson table, shown on page 304.

Country	Code Point (in hexadecimal)											
	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
U S A	#	\$	@	[	\	\]	^	'	{	|	}	~
France			à	°	ç	§			é	ù	è	¨
Germany			§	Ä	Ö	Ü			ä	ö	ü	ß
U K	£											
Denmark - 1		\$		Æ	Ø	Å			æ	ø	å	
Sweden		α	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy				°	\	é		ù	à	ò	è	ì
Spain - 1	¶			í	Ñ	¿			¨	ñ		
Japan					¥							
Norway		α	É	Æ	Ø	Å	Ü	é	æ	ø	ø	ü
Denmark - 2			É	Æ	Ø	Å	Ü	é	æ	ø	ø	ü
Spain - 2			á	í	Ñ	¿	é		í	ñ	ó	ú
Latin America I			á	í	Ñ	¿	é	ü	í	ñ	ó	ú
French Canadian			á	â	ç	ê	î	ô	é	ù	è	û
Latin America II					Ñ		ú	í	ó	á	é	ü

Appendix B. Application Paper Source Selection

Application-controlled paper-source selection

This section describes the identifiers to use in selecting the various available paper sources on the 4247 printer for key IPDS applications. These selections will cause the appropriate forms path selection commands to be sent to the printer from the host applications.

PSF usage - z/OS and System i

In the z/OS® PSF's (PSF/MVS, PSF/VSE, and PSF/VM), the desired paper source is identified in the FORMDEF, using the appropriate Media ID number as defined in the following sections. The FORMDEF can also be used in System i® PSF and uses these same Media ID numbers.

Paper source identification (media IDs)

Continuous forms or combination forms feeding: “Continuous Forms Feeding” uses either the front forms path or the rear forms path. The front path uses the forms that are fed into the front of the printer, and utilize the forms tractor installed in the standard (default) Front Push configuration when the optional second tractor is not installed. The standard (default) tractor becomes the rear tractor only when the optional second tractor is installed. In this condition the optional second tractor becomes the front tractor.

“Combination Forms Feeding” applies to the dual continuous forms (both front push and rear push path in use) printer configuration.

This is the common usage mode for the 4247. These identifiers should be used in all configurations.

In this configuration, the 4247 paper sources are identified by the host application as follows:

Front Media ID = 1
Rear Media ID = 2

The 4247 may be run in native (4247) mode or in an emulation mode (something other than 4247).

Creating form definitions (FORMDEFs)

In z/OS and AIX: Page Printer Formatting Aid (PPFA) can be used to create Form Definitions in the z/OS and AIX® environments.

In System i: System i supports user specification of a Form Definition with the PRTAFPDTA command and DEVTYPE=*AFPDS. Support for user named Form Definitions in the Printer File is included in System i V3R2 and V3R7 or later releases.

System i media selection (other than FORMDEF)

In System i, selecting the input media source requires a combination of two Printer File parameters, Form Feed (FORMFEED) and Source Drawer (DRAWER). The following selection parameters should be used whether the printer is configured in 4247 or emulation (4230/42x4) mode:

Front CF:	FORMFEED (*CONT)	(See notes 1 & 2)
Rear CF:	FORMFEED (2)	(See notes 1 & 2)
Note: The combination of settings with Automatic Eject = Enabled and Automatic Restore = Disabled is not recommended.		

Notes:

1. In OS/400® Version 3 Release 2 and Version 3 Release 7, the FORMFEED parameter has been enhanced to support explicit selection of the rear continuous form input source as follows:

Rear CF:	FORMFEED (*CONT2)
----------	-------------------

In this case, the AS/400® is aware that the Rear Continuous Forms is in fact a continuous form feed. Therefore a drawer parameter is not required and the Forms Alignment message can be issued.

2. When you are switching from one continuous forms path to the other, printed output must be manually torn off and removed from the printer before the first forms path can be parked. For this reason, you may want to use the FORM keyword in the AS/400 Printer File to alert the operator to remove any printer output before a job using a different forms path is sent.

Use of 'FORMS' parameters - z/OS and System i

For continuous forms printers with only a single continuous forms paper source, forms were specified using FORMS parameters in JCL or, for the AS/400, the FORMTYPE parameter. This method can still be used to have the operator change to the correct forms for the job. But it cannot be used to cause the printer to switch between the Front and Rear continuous forms sources.

Using 4247 with System i Host Print Transform

AS/400 Host Print Transform (HPT) provides two objects that allow you to use the multiple paper sources available on the 4247 printer.

The first is ***IBM4247DUAL**. This object provides support for the two tractor feeds, with DRAWER (1) meaning the front tractor feed and DRAWER (2) meaning the rear tractor feed.

Front Continuous Forms:	DRAWER (2)
Rear Continuous Forms:	DRAWER (4)

Support that includes this enhancement to the HPT objects can also be added to V4R1 or V4R2 by applying a PTF. For information, see the Euro I Info APAR, number II1523.

Appendix C. 4247 Bar Code and OCR Printing Options

This appendix contains information about the options that are available for printing bar codes and Optical Character Recognition (OCR) characters. The bar code charts detail the element (bar/space) width options, the wide-to-narrow element ratios, the magnification percentages, and the characters printed per inch plus whether the bar codes can be printed in low-contrast or high-contrast modes. Low-contrast mode provides the best throughput, while high-contrast mode results in the best bar code printing quality.

The OCR section contains the Optical Character Recognition symbol subsets that can be printed.

Bar Code Printing Options Charts

Keep the following statements in mind when printing bar codes.

- All bar codes printed by the 4247 Printer can print in high-contrast mode. Not all of them, however, can print in low-contrast mode. If you specify low-contrast mode for a bar code that is not supported in that mode, the printer will not return an error but will default to high-contrast mode instead.
- Vertically-rotated bar codes may not consistently meet bar/space width specifications. Users should test for application suitability.
- Bar codes printed in low-contrast mode may not consistently meet specifications. Users should test for application suitability.

Table 11. Bar Code Printing Options for Non-UPC Family Bar Codes

Bar Code Type	Narrow Element Width Options (mils)	Wide-to-Narrow Element Ratio	Low-Contrast Mode - Horizontal	Low-Contrast Mode - Vertical	Bar Code Char. Per Inch (CPI)
Code 3 of 9	13.9	2:1	Yes	Yes	5.54
	13.9	2.5:1	Yes	Yes	4.97
	13.9	3:1	Yes	Yes	4.5
	16.7	2:1	Yes	No	6.65
	16.7	2.5:1	Yes	No	5.95
	16.7	3:1	Yes	No	5.4
	20.8	2:1	Yes	Yes	3.69
	20.8	2.5:1	Yes	Yes	3.2
	20.8	3:1	Yes	Yes	3.0
	27.8	2:1	Yes	Yes	2.77
	27.8	2.5:1	Yes	Yes	2.48
	27.8	3:1	Yes	Yes	2.25
Interleaved 2 of 5	13.9	2:1	Yes	Yes	10.29
	13.9	2.5:1	Yes	Yes	9.0
	13.9	3:1	Yes	Yes	8.0
	16.7	2:1	Yes	No	12.35
	16.7	2.5:1	Yes	No	10.8
	16.7	3:1	Yes	No	9.6
	20.8	2:1	Yes	Yes	6.86
	20.8	2.5:1	Yes	Yes	5.76
	20.8	3:1	Yes	Yes	5.33
	27.8	2:1	Yes	Yes	5.14
	27.8	2.5:1	Yes	Yes	4.5
	27.8	3:1	Yes	Yes	4.0

Table 11. Bar Code Printing Options for Non-UPC Family Bar Codes (continued)

Bar Code Type	Narrow Element Width Options (mils)	Wide-to-Narrow Element Ratio	Low-Contrast Mode - Horizontal	Low-Contrast Mode - Vertical	Bar Code Char. Per Inch (CPI)
Industrial 2 of 5	13.9	2:1	Yes	Yes	6.0
	13.9	2.5:1	Yes	Yes	5.54
	13.9	3:1	Yes	Yes	5.14
	16.7	2:1	Yes	No	7.2
	16.7	2.5:1	Yes	No	6.65
	16.7	3:1	Yes	No	6.17
	20.8	2:1	Yes	Yes	4.0
	20.8	2.5:1	Yes	Yes	3.6
	20.8	3:1	Yes	Yes	3.43
	27.8	2:1	Yes	Yes	3.0
	27.8	2.5:1	Yes	Yes	2.77
	27.8	3:1	Yes	Yes	2.57
Matrix 2 of 5	13.9	2:1	Yes	Yes	9.0
	13.9	2.5:1	Yes	Yes	8.0
	13.9	3:1	Yes	Yes	7.2
	16.7	2:1	Yes	No	10.8
	16.7	2.5:1	Yes	No	9.6
	16.7	3:1	Yes	No	8.64
	20.8	2:1	Yes	Yes	6.0
	20.8	2.5:1	Yes	Yes	5.14
	20.8	3:1	Yes	Yes	4.8
	27.8	2:1	Yes	Yes	4.5
	27.8	2.5:1	Yes	Yes	4.0
	27.8	3:1	Yes	Yes	3.6
MSI	13.9	2:1	Yes	Yes	6.0
	13.9	2.5:1	Yes	Yes	5.14
	13.9	3:1	Yes	Yes	4.5
	16.7	2:1	Yes	No	7.6
	16.7	2.5:1	Yes	No	6.17
	16.7	3:1	Yes	No	5.4
	20.8	2:1	Yes	Yes	4.0
	20.8	2.5:1	Yes	Yes	3.27
	20.8	3:1	Yes	Yes	3.0
	27.8	2:1	Yes	Yes	3.0
	27.8	2.5:1	Yes	Yes	2.57
	27.8	3:1	Yes	Yes	2.25
Codabar	13.9	2:1	Yes	Yes	6.55 - 7.2
	13.9	2.5:1	Yes	Yes	5.76 - 6.55
	13.9	3:1	Yes	Yes	5.14 - 6.0
	16.7	2:1	Yes	No	7.86 - 8.64
	16.7	2.5:1	Yes	No	6.91 - 7.86
	16.7	3:1	Yes	No	6.17 - 7.2
	20.8	2:1	Yes	Yes	4.36 - 4.8
	20.8	2.5:1	Yes	Yes	4.00 - 4.5
	20.8	3:1	Yes	Yes	3.43 - 4.0
	27.8	2:1	Yes	Yes	3.27 - 3.6
	27.8	2.5:1	Yes	Yes	2.88 - 3.27
	27.8	3:1	Yes	Yes	2.57 - 3.0
Code 128	13.9	N/A	Yes	Yes	6.55
	16.7	N/A	Yes	No	7.86
	20.8	N/A	Yes	Yes	4.36
	27.8	N/A	Yes	Yes	3.27
					(See Note)

Table 11. Bar Code Printing Options for Non-UPC Family Bar Codes (continued)

Bar Code Type	Narrow Element Width Options (mils)	Wide-to-Narrow Element Ratio	Low-Contrast Mode - Horizontal	Low-Contrast Mode - Vertical	Bar Code Char. Per Inch (CPI)
POSTNET	21.2	N/A	Yes	Yes	4.3
Note: The CPI shown for Code 128 is for code sets A or B. The CPI for code set C is approximately double the values shown.					

Table 12. Bar Code Printing Options for UPC Family Bar Codes

Bar Code Type	Narrow Element Width Options (mils)	Wide-to-Narrow Element Ratio	Low-Contrast Mode - Horizontal	Low-Contrast Mode - Vertical	Bar Code Char. Per Inch (CPI)
UPC A	13.9	1.07	Yes	Yes	10.29
	16.7	1.07	Yes	No	12.35
UPC E	13.9	1.07	Yes	Yes	10.29
	16.7	1.07	Yes	No	12.35
UPC/EAN-2	13.9	1.07	Yes	Yes	10.29
	16.7	1.07	Yes	No	12.35
UPC/EAN-5	13.9	1.07	Yes	Yes	10.29
	16.7	1.07	Yes	No	12.35
EAN 8	13.9	1.07	Yes	Yes	10.29
	16.7	1.07	Yes	No	12.35
EAN-13	13.9	1.07	Yes	Yes	10.29
	16.7	1.07	Yes	No	12.35

Optical Character Recognition (OCR) Printing

OCR Symbols

The 4247 prints a comprehensive set of OCR-A and OCR-B characters derived from standards developed by the International Standards Organization (ISO) and the American National Standards Institute (ANSI). All OCR character shapes produced by the 4247 Printer are not identical with the shapes defined in these standards. Users should test OCR printing with their scanning equipment to verify satisfactory performance.

OCR Scanning

We have tested the following OCR symbol subsets for readability:

Table 13. OCR Symbol Subsets

OCR-A NRMA	OCR-A Data Entry	OCR-A Eurobanking	OCR-A Money Transfer	OCR-B ECMA	OCR-B Money Transfer
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9
A	A	C	hook	C	>
B	B	P	fork	E	+
C	C	R	chair	N	<
D	D	U		S	
M	M	X		T	
N	N	Z		V	
P	P	/		X	
R	R	+		Z	
U	U	#		>	
X	X	hook		<	
Y	Y	fork		+	
>	>	chair			
/	/				
"	+				

Appendix D. Configuration Menu Lockout

Configuration Menu Lockout should be used by the application programmer or printer operator to lock the Configuration Menu when you want to prevent a casual operator from changing parameter values that have been set for print jobs.

To set Configuration Menu Lockout:

1. Press **STOP** if the **READY** indicator is on. The printer goes to the **NOT READY** state.
2. In the **NOT READY** state, press and hold **TEST**, then press **START**. Release both keys. The printer displays

Press STOP

Note: Do *not* press **STOP**. Press **SET TOP OF FORM**. The Configuration Menu is now locked.

Appendix E. Interfaces

This section provides technical information for the parallel and serial interfaces.

The Parallel Interface

The parallel interface of this printer fully supports the Centronics protocol plus the specific features requested by the EPSON and IBM printer connection in monodirectional mode and the Compatibility and Nibbles modes in bidirectional mode, plus the negotiation phases and the device identifier (as IEEE P1284).

The parallel interface is available on a specific 36 contact connector type AMPHENOL 57-40360- 12-D56 or equivalent connector for 1284 Type B.

- Drive Capability
Up to 15 feet (5 m) on AWG26 min. wire size of twisted conductors on TTL receiver. The max. reachable distance is conditioned by the host drive capability and by the noise level along the interface cable path.
- Printer Connector Type
36 pins, 1284 Type B
- Cable Connector
25 pin, 1284 A Type

Signals Description

According to the IEEE - P1284 Standard, the pins assume different meanings and are identified by different names depending on the actual handshaking mode as follows:

- Compatibility mode (Centronics)
This is the lower level mode provides an asynchronous, byte-wide forward (host-to-peripheral) channel with data and status lines used according to their original definitions. The interfaces power up in the compatibility Mode Idle phase.
- Nibble Mode
This mode provides an asynchronous, reverse (peripheral-to-host) channel, under control of the host. In this mode, peripheral device to host data bytes are sent as two sequential, four-bit nibbles using the four peripheral-to-host status lines. These two modes cannot be active simultaneously.
- Byte Mode
This mode provides an asynchronous, byte-wide reverse (peripheral-to host) channel based on eight data lines of the interface for data and the control/status lines for handshaking. Byte mode is under host control and it cannot be simultaneously active with compatibility mode.

Operating Phases

The link protocol is mainly based on the following three phases:

- Negotiation Phase
This phase is activated always by the host, only when in compatibility mode, and defines:
 - whether a bidirectional link protocol can be established.
 - the handshaking mode as well as the communications mode to be used.
 - the device identification, if supported.
- Communication Phase
This phase is based on well defined handshaking rules which depend upon the selected link mode.
- Termination Phase

This phase is initiated by the host and returns the interface to the compatibility mode.

Parallel Interface Signals

Description of the signals in monodirectional link:

Signal Name	Pin N°	Source	Description
STROBE	1	HOST	Clock signal which controls data transmission with its falling edge.
ACK	10	PRINTER	Negative pulsed signal indicating that the printer has received data and is ready to accept the next set of data. Also sent when the printer is switched from off-line to on-line and at the end of the initialization time. The BUSY line is always active.
DATA BIT 1 DATA BIT 2 DATA BIT 3 DATA BIT 4 DATA BIT 5 DATA BIT 6 DATA BIT 7 DATA BIT 8	2 3 4 5 6 7 8 9	PRINTER / HOST	Data 8 is the most significant bit. These are the data lines used by host or printer to transfer control code or ASCII codes.
BUSY	11	PRINTER	When high, this signal indicates that the printer cannot accept data or control codes. This signal goes high during data processing, in test and program modes, during initialization, when the buffer is full, and when a paper jam, paper end or paper size error occurs, in case of a power-on reset, the reception of a STROBE signal, while the register was not yet read, or when the INIT line is still active.
PE	12	PRINTER	When high, this signal indicates that the automatic input bin is out of paper and paper cannot be loaded from an other bin.
SELECT	13	PRINTER	When high, this signal indicates that the printer is on-line. It is put to low state in case of initialization or test and program mode. In IBM Proprinter emulation in low condition this signal signals a off-line request from the operator panel, paper jam, paper end or paper size errors.
AUTOFEEDXT	14	HOST	Active low level signal. Indicates whether a LF is performed after a CR or not.
GND	16	–	Logical ground level (0V).
CHASSIS GND	17	–	Frame ground.
+5 VDC	18	PRINTER	Is the DC voltage supplied by a component that limits the driven capability up to 100 mA.
SIGNAL GND	19-30	–	Signal ground.
INIT	31	HOST	Active low level signal. Indicates, that the printer is initializing. The BUSY signal is forced high.
ERROR	32	PRINTER	When low, this signal indicates that the printer is offline, there is an offline request from the operator panel, or the printer is in an error state because of: paper jam, paper end or paper size error, engine error, output bin full or cover open condition.
+5V	35	PRINTER	Pulled up to signal.
SELECTIN	36	HOST	Active low level signal. Enables the printer.

The pins 1 to 14 of the printer are connected to the pins with the same number of the parallel port of the host.

The pins 19 to 30 of the printer are connected to the pins 18 to 25 of the parallel port of the host.

The pins 31, 32 and 36 of the printer are connected respectively to the pins 16, 15 and 17 of the parallel port of the host.

1284 Mode signal names are shown with their Compatibility mode (Centronics) names in parenthesis () for the bidirectional link.

Signal Name	Pin N° for Signal Wire	Pin N° for Return Wire	Source
HostClk (nStrobe)	1	19	HOST
AD1 (Data 1)	2	20	HOST in Compatibility mode and negotiation phase. NOT USED in Nibble mode. BIDIRECTIONAL in Byte mode.
AD2 (Data 2)	3	21	
AD3 (Data 3)	4	22	
AD4 (Data 4)	5	23	
AD5 (Data 5)	6	24	
AD6 (Data 6)	7	25	
AD7 (Data 7)	8	26	
AD8 (Data 8)	9	27	
PrtClk (nAck)	10	28	PRINTER
PrtBusy (Busy)	11	29	PRINTER
AckDataReq (PError)	13	28	PRINTER
Xflag (Select)	14	28	PRINTER
HostBusy (nAutofd)	15	30	HOST
Peripheral Logic High (+5 V)	18		PRINTER
n.a. (nInit)	31	30	HOST
nDataAvail (NFault)	32	29	PRINTER
1284 Active (NSelectIn)	36	30	
Common Logic Ground	16 and Return Wires		
Chassis Ground	17		

Parallel Interface Signals Behaviour

HostClk /nWrite (nStrobe)	
Compatibility Mode:	Set Active low to transfer data into printer input latch. Data is valid while nStrobe is low.
Negotiation Phase:	Set active low to transfer extendibility request value into printer input latch. Data is valid on the falling edge of HostClk.
Reverse Data Transfer Phase:	Set high during Nibble Mode transfer to avoid latching data into printer. Pulsed low during Byte Mode transfers to acknowledge transfer of data from the printer. The printer shall ensure that this pulse does not transfer a new data into the printer input latch.

AD1 ... AD8 (Data 1 ... Data 8)	
Compatibility Mode:	Forward channel data.

AD1 ... AD8 (Data 1 ... Data 8)		
Negotiation Phase:	Extendibility request value.	
Reverse Data Transfer Phase:	Nibble Mode:	NOT USED.
	Byte Mode:	Reverse channel data.

PrtClk (nAck)		
Compatibility Mode:	Pulsed low by the printer to acknowledge the transfer of a data from the host.	
Negotiation Phase:	Set low to acknowledge 1284 support, then set high to indicate that the Xflag (Select) and data available flags may be read.	
Reverse Data Transfer Phase:	Used in both Nibble and Byte Modes to qualify data being sent to the host.	

PrtBusy (Busy)		
Compatibility Mode:	Driven high to indicate that the printer is not ready to receive data.	
Negotiation Phase:	Reflects the present state of the printer's forward channel.	
Reverse Data Transfer Phase:	Nibble Mode:	Data bits 3 then 7, then forward channel busy status
	Byte Mode:	Forward channel busy status.
Reverse Idle phase:	Forward channel busy status.	

AckDataReq (PErrr)		
Compatibility Mode:	Driven high to indicate that the printer has encountered an error in the paper path. The printer shall set nFault low whenever it sets PError high.	
Negotiation Phase:	Set high to indicate 1284 support, then follows nDataAvail (nFault).	
Reverse Data Transfer Phase:	Nibble Mode:	Data bits then 6.
	Byte Mode:	same as nDataAvail (nFault)
Reverse Idle phase:	Set high until host requests data transfer, then follows nDataAvail (nFault).	

Xflag (Select)		
Compatibility Mode:	Set high to indicate that the printer in on-line.	
Negotiation Phase:	The Xflag refers to extendibility flag. Used by the printer to reply to the requested extendibility byte sent by the host during the negotiation phase. The signal level is low for Nibble Mode, high for Byte Mode.	
Reverse Data Transfer Phase:	Nibble Mode:	Data bits 1 then 5.
	Byte Mode:	Same as negotiation phase.
Reverse Idle phase:	Same as negotiation phase.	

Xflag (Select)		
Compatibility Mode:	Set low by host to put the printer into auto-line feed mode.	
Negotiation Phase:	Set low in conjunction with 1284 Active (NSelectIn) being set high to request a 1284 mode.	
	Then set high after printer sets PtrClk (nAck) low.	

Xflag (Select)		
Reverse Data Transfer Phase:	Nibble Mode:	Set low to indicate that host can receive printer-to-host data then set high to acknowledge receipts of that nibble.
	Byte Mode:	Same as Nibble Mode to request and acknowledge bytes. Following a reverse channel transfer the interface transitions to idle phase when HostBusy (nAutoFd) is set low and printer's no data available.
Reverse Idle phase:	Set high in response to PtrClk (nAck) low pulse to re-enter reverse data transfer phase. Is set high with 1284 Active (nSelectIn) being set low, the 1284 idle phase is being aborted and the interface returns to Compatibility Mode.	
Peripheral Logic High (+ 5V)		
Set high to indicate that all other signals sourced by the printer are in valid state. Set low to indicate the printer is off.		

n.a. (nInit)	
Compatibility Mode:	Pulsed low in conjunction with 1284 Active low to reset the interface and force to return to Compatibility Mode idle phase.
Negotiation Phase:	Set HIGH.
Reverse Data Transfer Phase:	Set HIGH.

nDataAvail (NFault)		
Compatibility Mode:	Set low to indicate that an internal printer error has occurred.	
Negotiation Phase:	Set high to acknowledge 1284 compatibility. In Nibble or Byte Mode it is then set low to indicate printer-to-host data is available following host setting HostBusy (nAutoFd) high.	
Reverse Data Transfer Phase:	Nibble Mode:	Set low to indicate that printer is ready to send to host. Then used to send data bits 0 then 4.
	Byte Mode:	Used to indicate that data is available.
Reverse Idle phase:	Used to indicate that data is available.	

nDataAvail (NFault)		
Compatibility Mode:	Set low to indicate that an internal printer error has occurred.	
Negotiation Phase:	Set high to acknowledge 1284 compatibility. In Nibble or Byte Mode it is then set low to indicate printer-to-host data is available following host setting HostBusy (nAutoFd) high.	
Reverse Data Transfer Phase:	Nibble Mode:	Set low to indicate that printer is ready to send to host. Then used to send data bits 0 then 4.
	Byte Mode:	Used to indicate that data is available.
Reverse Idle phase:	Used to indicate that data is available.	

1284 Active (NSelectIn)	
Compatibility Mode:	Set low by host to select printer.
Negotiation Phase:	Set high in conjunction with Host Busy being set low to request a 1284 mode.
Reverse Data Transfer Phase:	Set high to indicate that bus direction is printer to host. Set low to terminate 1284 mode and set bus direction host to printer.
Reverse Idle Phase:	Same as Reverse Data Transfer phase.

Interface Timing

Timing and Handshaking depend upon the connection mode.

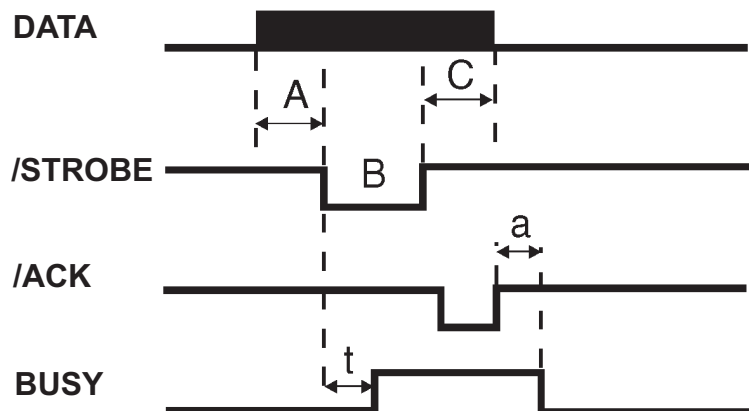


Figure 31. Mode Centronics

Our Centronics mode supports the BUSY-WHILE-STROBE busy signal timing and ACK-INBUSY as BUSY-ACK relationship.

Legend	Time interval	Min.	Max.	all times in μ s
A	Data Setup Time	1.0		
B	Strobe pulse width	1.0	500	
C	Data hold time	1.0		
t	Busy while Strobe	0.25	1.0	
a	Ack in Busy	0	2.5	

Mode IEEE 1284

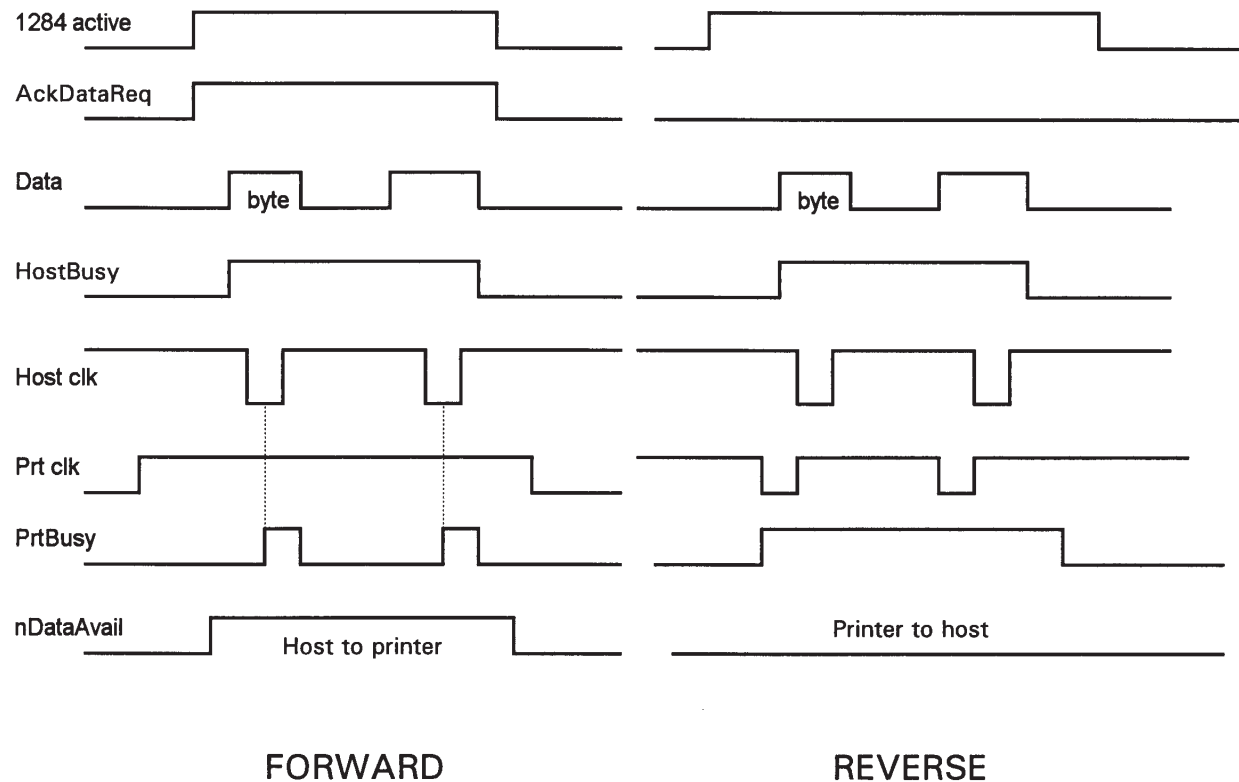


Figure 32. Mode IEEE 1284

The Serial Interface

This printer provides the RS-232/C serial interfaces. The interface mode is selected via menu.

- Transmission Type

Data is sent and received in start/stop (asynchronous) transmission.

- Character Format

Each character is transmitted in the following format:

1 START BIT + 8 DATA BITS + 1 PARITY BIT + 1 STOP BIT

The least significant bit of the data bits is sent first after the start bit. The number of data bits is selected via menu. The parity bit, when present, follows the data bits. The start bit is a logical "0" and the stop bit is a logical "1". The start and stop bits are used as character framing bits.

- Printer Connector

Male DB9 or equivalent connector.

- Drive Capability

Max. 50 feet (15 m) for all supported data rates. The RS-422/A interface is effective up to 1200 m.

Serial Interface Signals

The following table lists the RS-232/C serial interface signals:

Signal Name	Pin Number	Local Connect. Source	Remote Connect. Source	Description
SIGNAL GROUND	5	—	—	Always connected to the 0 Volts of the Power Supply
TXD	3	Printer	Printer	Transmitted Data Signal (an output from printer). A MARK condition is held during IDLE communication state. An indeterminate state is present when printer is powered off.
RXD	2	Host	Data Set	Received data signal (an input to printer).
RTS	7	Printer	Printer	Request to Send Signal (an output from printer). Active HIGH level signal. It is HIGH until the printer is powered off, then an indeterminate state is present .
CTS	8		Data Set	Active HIGH level signal indicates that the host or data set is ready to receive data from the printer.
DSR	6		Data Set	Active HIGH level signal. Indicates that the host or data set is ready to be connected to the printer and is ready for data transfer.
DCD	1		Data Set	Active HIGH level signal. Indicates that the host is transmitting or the data set is receiving the Data Carrier signal.
2nd RTS	9	Printer		Functionally equivalent to the DTR signal.
DTR	4	Printer	Printer	Data Terminal Ready. Normally HIGH (ON). Indicates that the printer is ready to initiate a connection.

LAN Interface Port

LAN Interface Port

1. Ethernet 10/100BaseT Connector
2. Green 10/100Mbit/sec. Transmission Speed LED
3. Yellow Traffic LED

LED Indicators

The LED indicator modes are described in the following table:

LED	Status	Description
Yellow LED	Unlit	Transmission speed at 10Mbit/sec.
	Lit	Transmission speed at 100Mbit/sec.
Green LED	Blinks	Transmitting or receiving packets from the network.

USB Interface Port

USB 2.0 full speed 12/Mbit/sec. interface.

Appendix F. Network Interface Technical Reference

4247 Network Configuration Parameters

IP Address Assignment

Fixed: Assigns the static or fixed IP address.

DHCP: Assigns the dynamic IP address (DHCP protocol).

Default value is Fixed.

Fixed and DHCP assignments of IP addresses are supported. On most networks, you will want to assign a permanent IP address and disable DHCP.

IP Address

These values set the IP Address. The address is represented by a decimal notation where the decimal values are divided by points in four fields.

Each field ranges between 0 and 255.

Default is *127.000.000.000*.

Subnet Mask

These values set the Subnet Mask number. This number is represented by a decimal notation where the decimal values are divided by points in four fields. Each field ranges between 0 and 255.

Default is *255.255.254.000*.

Default Gateway

These values set the Default Gateway address. This address is represented by a decimal notation where the decimal values are divided by points in four fields. Each field ranges between 0 and 255.

Default is *000.000.000.000*.

The gateway address tells the printer which router or gateway to use to access other subnets or hosts. Simply add your router's IP address as the default gateway. All packets destined for other subnets will be forwarded to the default gateway for delivery to the destination host.

Host Name

The host is identified by a name in the NetBIOS protocol over TCP/IP. This function allows creating the name of the host using a 14-character string.

Default is *4247_xxxxxx* where *xxxxxx* are the last 6-digits of the MAC address...

Workgroup Name

The workgroup is identified by a name in the NetBIOS protocol over TCP/IP in Windows. This function allows creating the name of the workgroup using a 14-character string.

Default is *Workgroup*.

SMTP Service

SMTP (Simple Mail Transfer Protocol) allows a mail server address to be entered into the printer configuration to send automated e-mail notifications with printer alert conditions.

Disabled: Disables the SMTP (Simple Mail Transfer Protocol) service, that is disables the reception/transfer/error service of the e-mail.

Enabled: Enables the SMTP service, that is it enables the reception/transfer/error service of the e-mail.

Default is *Disabled*.

Below is a list of SMTP display error messages:

1. SERVICE REQUESTED. Technical personnel intervention is required.

The display can show:

050 MACHINE CHECK (S/W ERROR)
051 MACHINE CHECK (S/W ERROR)
052 MACHINE CHECK (S/W ERROR)
053 MACHINE CHECK (ENGINE ERROR)
054 MACHINE CHECK (LAN ERROR)
055 MACHINE CHECK (AFTA ERROR)
056 MACHINE CHECK (PRINT ERROR)
089 RIBBON JAM

2. COVER OPEN. The display shows:

096 COVER OPEN

3. NO PAPER. The display shows:

001 END OF FORMS

4. PAPER JAM. The display can show:

002 FORMS JAMMED FRONT
020 FORMS JAMMED REAR
099 FORMS JAMMED

Mail Server Address

These values set the mail server address. This number is represented by a decimal notation where the decimal values are divided by points in four fields. Each field ranges between 0 and 255.

Default is *000.000.000.000*.

Note: Item selection on the printer menu allowed only if the “SMTP Service” function choice is Enabled.

E-mail Address (Receiver)

This function allows writing the e-mail address where you can notify the failures using a 48-character string. Default is an empty string.

Note: Item selection on the printer menu allowed only if the “SMTP Service” function choice is Enabled.

E-mail Address (Sender)

This function allows to write the sender e-mail address using a 48-character string.

Default is an empty string.

Note: Item selection on the printer menu allowed only if the “SMTP Service” function choice is Enabled.

Location

You can enter the physical location of the printer into this field.

Contact

You can enter a network support contact's name and phone number into this field.

Managing a Single Printer Configuration Using the 4247 Internal Webpage

Configuration Password

The 4247's configuration settings can be protected by a password to keep unauthorized users from making changes. When you try to submit any 4247 configuration change, you will be asked for your user name and password. At the prompt, enter the default user **name = root** and **default password = root**, unless you have setup another user name and password with root privileges.

Storing and Saving Settings

When settings are configured on the 4247 and the SUBMIT button on the related page has been pressed, you will be reminded to Reboot the printer to ensure the latest settings are in use. To reset the 4247, go to the Home page, enter the Power On Reset page, and Click on the REBOOT PRINTER button.

Managing Multiple Printers Using the 4247 Remote Printer Management Utility

The Remote Printer Management Utility (RPMU) is a software tool for network administrator's that allows the configuration and control of 4247 printers remotely over a LAN. With this tool the installed printers can be controlled, configured and organized easily. The main features are:

Device Discovery - Searches for the devices within a range of IP addresses.

Printer Organization - Printers connected to the network can be organized into logical groups in a hierarchically structured tree.

Printer Status Report - Checks the printer's status and reports alarms.

Printer Configuration - Printers may be configured as needed from the administrator's workstation. Change the configuration of single printers, or simultaneously change the configuration of multiple printers in your enterprise, anywhere, and anytime.

Firmware Updating - Provides a firmware download function to upgrade the printer's firmware.

Remote Operator Panel Management - Provides a virtual operator panel for the remotely connected printer at the administrator's workstation that allows performing all functions normally achieved pressing the operator panel keys. The RPMU also provides the basic status management for third-party printers compliant to the standard MIB objects. Visit our website to download this free software utility program.

4247 Network Interface Summary

INSTALLATION INTEGRATION	
Network speed / connection	10/100 BASET
Auto-detection 10/100 network speed	Yes
Manual network speed selection	No
Parallel interface free	Yes
Network configuration through printer operator panel	Yes
Web page network setting configuration	Yes
Web page login password protection	Yes
Web page default user-id and default password	Root, Root
Windows Port Monitor and Drivers	Yes
NIC configuration printout	Yes
DHCP	Yes

WINS	Yes
DDNS	Yes
SYSTEM / OS	
IBM System i OS 400	Yes
IBM pSeries® AIX	Yes
Sun Solaris	Yes
Unix	Yes
Linux®	Yes
Windows 95,98,2000,NT,XP, 2003 Server	Yes
NETBIOS over TCP	Yes
NETBEUI	No
Novell Netware	No
OS2	No
MacIntosh / Apple EtherTalk	No
PRINTING METHODS	
Raw Port 9100	Yes
LPD/LPR Port 515	Yes
LPR print queue name	Any name (PR1, d1PRN, etc.) can be used.
IPDS Port 5100	Yes (with IPDS option on some models)
Interleaved multi-protocol communications	Yes
Hot Interface switching	Yes between Parallel and LAN interfaces
Hot Port switching	Yes between Raw 9100, LPR/LPD 515, and IPDS 5100 (with IPDS option installed on some models)
Multiple internal print server queues	No
String substitutions	No
String before/after job	No
DATASTREAMS	
4247 ASCII native	Yes
ASCII text and single byte escapes	Yes
IBM Proprinter XL24 / XL24 AGM emulation	Yes (on some models)
IBM Personal Printer 2391 emulation	Yes (on some models)
IBM Proprinter III XL emulation	Yes (on some models)
IBM Personal Printer 2381 emulation	Yes (on some models)
Epson LQ series emulation	Yes (on some models)
Epson - FX emulation	Yes (on some models)
Epson LQ1600K with GB18030 character set emulation	Yes (with DBCS option on some models)
IPDS	Yes (with IPDS option on some models. See Chapter 3, "Intelligent Printer Data Stream," on page 75 for application program compatibility considerations)
PRINTER SERVER FACILITIES SUPPORT	
PSF AIX	Yes
PSF OS400	Yes
PSF MVS™	Yes

PSF VSE	Yes
PSF VM	Yes
NETWORK MANAGEMENT	
4247 Remote Printer Management Utility	Yes
IBM NPM	Yes (generic printer)
HP JetAdmin	Yes (generic printer)
E-mail SMTP	Yes
Internal Web page	Yes
PRINTER STATUS AND ERROR REPORTING	
Ready	Yes
Not ready	Yes
Paper out	Yes
Paper jam	Yes
Cover open	Yes
Machine check (carriage fault, ribbon blocked...)	Yes
NETWORK CONFIGURATION PARAMETERS (see above)	
LINK LAYER	
Ethernet II	Yes
802.2	Yes
802.3	Yes
2/SNAP	Yes
Link disconnect (no data timeout)	15 second fixed setting
PROTOCOLS	
IP	Yes
TCP	Yes
UDP	Yes
ARP	Yes
RARP	Yes
SMP	Yes
Telnet	Yes
DHCP	Yes
DDNS	Yes
WINS	Yes
BOOTP	Yes
FTP	Yes
TFTP	Yes
ICMP	Yes
LPR/LPD	Yes
DHCP	Yes
SNMP	Yes
SMTP	Yes
Direct Socket Printing	Yes

HTTP	Yes
PING	Yes
SNMP	Yes
MIB II (RFC 1514)	Yes (see note)
Host Resource MIB (RFC 1514)	Yes
Printer MIB (RFC1759)	Yes
4247 Private MIB	Yes
Reverse Telnet	No
PROS	No
IPP	No
SLPv2	No
HARDWARE	
RISC processor	Yes
Flash memory	4MB
RAM	16MB
Attachment connector type	RJ-45
Network traffic led	Yes (green)
Network speed led	Yes (yellow)
FIRMWARE UPGRADE	
Firmware upgrade over network	Yes
Firmware upgrade through parallel interface	Yes
<p>Note: All relevant parts of MIB-II (RFC1231) required to support HP JetAdmin are implemented.</p> <ul style="list-style-type: none"> - The following IP table group OIDs are not implemented: ipForwarding, ipDefaultTTL , ipInReceives ,ipInHdrErrors,ipInAddrErrors, ipForwDatagrams, ipInUnknownProtos, ipInDiscards, ipInDelivers, ipOutRequests, ipOutDiscards, ipOutNoRoutes, ipReasmTimeout ,ipReasmReqds, ipReasmOKs,ipReasmFails,ipFragOKs, ipFragFails, ipFragCreates The ipRouteTable OIDs are not implemented. The ipNetToMediaTable OIDs are not implemented. The icmp group OIDs are not implemented. The tcp group OIDs are not implemented. The udp group OIDs are not implemented. The snmp group OIDs are not implemented. 	

IBM systems - LAN printing technical support documents on the world-wide-web

The following AS/400 iSeries® documents and many others can be found by selecting the "Technical databases" link at the System i Technical Support area of the IBM website.

32815, Configuring a *LAN 3812 SNMP Device Description

This document contains information on configuring *LAN 3812 SNMP device descriptions for LAN attached ASCII printers. The term SNMP refers to Simple Network Management Protocol. SNMP allows for two-way communication with the printer when attached to the LAN using a print server that also supports SNMP. Support for the SNMP print driver is available in the base code for R450 IBM OS/400 and above, and is being added to R430 and R440 OS/400 through PTFs. This is an alternative to using Remote Output Queues (RMTOUTQs).

19934440, Recommended SNMP Port Number Values for *LAN 3812 SNMP Device Descriptions

This document contains a list of recommended SNMP Port Number Values for *LAN 3812 SNMP printer device descriptions, depending on the type of network interface or print server being used with your printer. The Port number (PORT) parameter specifies which TCP/IP port to use when printing operating system spooled files from an IBM System i family of servers system through a *LAN 3812 SNMP device description to a printer on a Local Area Network (LAN) or Wide Area Network (WAN). Therefore, the specified TCP/IP port must be open on any firewalls, routers or SOCK servers used between the iSeries family system and the printer. If the specified TCP/IP port is closed, the printer writer for the *LAN 3812 SNMP device description will be unable to open a connection with the printer and will therefore not be able to print to that printer.

8983237, Configuring a Remote Output Queue (RMTOUTQ)

This document contains information on configuring and using a Remote Output Queue (RMTOUTQ) for sending IBM OS/400 or IBM i5/OS® spooled files to an output queue on another IBM System i family of servers, or to print OS/400 or i5/OS spooled files to printers that are attached to the LAN/WAN using a print server, a PC, or a Unix server. Requirements include a TCP/IP interface configured in the OS/400 or i5/OS, a TCP/IP address on the printer side, and a Line Print Daemon (LPD) TCP/IP process running on the print server, PC or Unix server.

18762910, Configuring a *LAN 3812 Device Description that Uses the LPR Print Driver (TSPLPRD) Exit Program

The LPR Print Driver (TSPLPRD) exit program is an unsupported utility that provides the function of sending spooled files from an output queue to an ASCII printer which is attached to an LPD server. This is a similar function to what is provided using remote output queues in IBM OS/400 or IBM i5/OS, but differs because this driver exit program is specified on a printer device description. Thus, it can make use of information specified about the printer in the device description which is not available on a remote output queue. Also, because it uses LPR within a printer writer, it supports page ranges that can be used with any printer that currently uses a remote output queue – including dot matrix and line printers.

This exit program also serves the purpose of providing an example of a Print Driver Exit, as it is written to the Print Driver Exit interface as documented in the *AS/400 System API Reference* manual. This exit program was introduced in the R440 version of QUSRTOOL, but will work with R410 and later versions of OS/400. This tool is supplied as is without support. Therefore, any assistance with configuring or using a printer device description that uses an LPR print driver exit program must be done through Consult Line/400.

IPDS Services Facility (PSF) printing

Print Services Facility™ (PSF) serves as the print manager for Advanced Function Printing™ (AFP™) on the IBM zSeries®. and iSeries system platforms. PSF helps you to support complex document requirements, manage all of the elements required in each document and dynamically deliver the pages to the printer.

The 4247 printer is supported by the following (PSF) software facilities.

- Print Services Facility for z/OS
- Print Services Facility for i/OS
- Print Services Facility for VSE
- Print Services Facility for VM

Notes:

1. In PSF z/OS the 4247 is only supported in 4247 native and 4224 emulation modes.
2. In PSF z/OS the 4230 printer was supported in 4224 emulation mode only and not in native mode.

PSF support documents can be found by selecting the “Software” link at the IBM website.

The following documents and many others can be found by selecting the “Technical databases” link at the System i Technical Support area of the IBM website.

Configuring a *LAN IPDS Device Description

This document contains information on configuring *LAN IPDS device descriptions for LAN attached IPDS printers. Support for *LAN IPDS device descriptions is available in the base code for R410 OS/400 and above, as well as R370 OS/400 (which is no longer supported).

Note: Print Services Facility/400 (PSF/400) must be installed and licensed in order to print to LAN attached IPDS printers.

24475739, Recommended IBM IPDS Port Number Values for *LAN IPDS Device Descriptions

This document contains a list of recommended IBM® IPDS™ Port Number Values for *LAN IPDS printer device descriptions, depending on the type of network interface or print server being used with your printer. The Port number (PORT) parameter specifies which TCP/IP port to use when printing operating system spooled files from an IBM System i system through a *LAN IPDS device description to a printer on a Local Area Network (LAN) or Wide Area Network (WAN). Therefore, the specified TCP/IP port must be open on any firewalls, routers, or SOCK servers used between the System i system and the printer. If the specified TCP/IP port is closed, the printer writer for the *LAN IPDS device description will not be able to open a connection with the printer and will, therefore, not be able to print to that printer.

The following publications can be found by searching the publication number (for example, S550-0427) at the “Support” link at the following IBM website.

www.ibm.com

G544-3877, PSF: AIX for PSF Users

This publication provides AFP and PSF information for AIX users interested in installing and using PSF for AIX for printing in the AIX environment. Topics include: an overview of PSF; how PSF for AIX fits in with the existing AIX print processes; benefits of PSF for AIX; hardware and software prerequisites; migration considerations, and administration and usage considerations.

Appendix G. LAN Interface MIB Support

Table 14. SYSTEM GROUP - RFC 1213

OBJECT ID	MIB	TYPE
sysDescr.0	1.2.6.1.2.1.1.1.0	(octet string)
sysObjectID.0	1.2.6.1.2.1.1.2.0	(object identifier)
sysUpTime.0	1.2.6.1.2.1.1.3.0	(timeticks)
sysContact.0	1.2.6.1.2.1.1.4.0	(octet string)
sysName.0	1.2.6.1.2.1.1.5.0	(octet string)
sysLocation.0	1.2.6.1.2.1.1.6.0	(octet string)
sysServices.0	1.2.6.1.2.1.1.7.0	(integer)

Table 15. INTERFACE GROUP - RFC 1213

OBJECT ID	MIB	TYPE
ifNumber.0	1.3.6.1.2.1.2.1.0	(integer)
ifIndex.1	1.3.6.1.2.1.2.2.1.1.1	(integer)
ifDescr.1	1.3.6.1.2.1.2.1.1.2.1	(octet string)
ifType.1	1.3.6.1.2.1.2.2.1.3.1	(integer)
ifMtu.1	1.3.6.1.2.1.2.2.1.4.1	(integer)
ifSpeed.1	1.3.6.1.2.1.2.2.1.5.1	(gauge)
ifPhysAddress.1	1.3.6.1.2.1.2.2.1.6.1	(octet string)
ifAdminStatus.1	1.3.6.1.2.1.2.2.1.7.1	(integer)
ifOperStatus.1	1.3.6.1.2.1.2.2.1.8.1	(integer)
ifLastChange.1	1.3.6.1.2.1.2.2.1.9.1	(timeticks)
ifInOctets.1	1.3.6.1.2.1.2.2.1.10.1	(counter)
ifInUcastPkts.1	1.3.6.1.2.1.2.2.1.11.1	(counter)
ifInNUcastPkts.1	1.3.6.1.2.1.2.2.1.12.1	(counter)
ifInDiscards.1	1.3.6.1.2.1.2.2.1.13.1	(counter)
ifInErrors.1	1.3.6.1.2.1.2.2.1.14.1	(counter)
ifInUnknownProtos.1	1.3.6.1.2.1.2.2.1.15.1	(counter)
ifOutOctets.1	1.3.6.1.2.1.2.2.1.16.1	(counter)
ifOutUcastPkts.1	1.3.6.1.2.1.2.2.1.17.1	(counter)
ifOutNUcastPkts.1	1.3.6.1.2.1.2.2.1.18.1	(counter)
ifOutDiscards.1	1.3.6.1.2.1.2.2.1.19.1	(counter)
ifOutErrors.1	1.3.6.1.2.1.2.2.1.20.1	(counter)
ifOutQLen.1	1.3.6.1.2.1.2.2.1.21.1	(gauge)
ifSpecific.1	1.3.6.1.2.1.2.2.1.22.1	(object identifier)

Table 16. ADDRESS GROUP - RFC 1213

OBJECT ID	MIB	TYPE
IpAdEntAddr.1	1.3.6.1.2.1.4.20.1.1.1	(ipaddress)
IpAdEntIfIndex.1	1.3.6.1.2.1.4.20.1.1.2	(integer)

Table 16. ADDRESS GROUP - RFC 1213 (continued)

OBJECT ID	MIB	TYPE
IpAdEntNetMask.1	1.3.6.1.2.1.4.20.1.1.3	(ipaddress)
IpAdEntBcastAddr.1	1.3.6.1.2.1.4.20.1.1.4	(integer)
IpAdEntReasmMaxSize.1	1.3.6.1.2.1.4.20.1.1.5	(integer)

Table 17. HOST RESOURCES - RFC 1213

OBJECT ID	MIB	TYPE
hrSystemUptime.0	1.3.6.1.3.1.25.1.1.0	(timeticks)
hrStorageIndex.1	1.3.6.1.3.1.25.2.3.1.1.1	(integer)
hrStorageIndex.2	1.3.6.1.3.1.25.2.3.1.1.2	(integer)
hrStorageIndex.3	1.3.6.1.3.1.25.2.3.1.1.3	(integer)
hrStorageIndex.4	1.3.6.1.3.1.25.2.3.1.1.4	(integer)
hrStorageType.1	1.3.6.1.3.1.25.2.3.1.2.1	(object identifier)
hrStorageType.2	1.3.6.1.3.1.25.2.3.1.2.2	(object identifier)
hrStorageType.3	1.3.6.1.3.1.25.2.3.1.2.3	(object identifier)
hrStorageType.4	1.3.6.1.3.1.25.2.3.1.2.4	(object identifier)
hrStorageDescr.1	1.3.6.1.3.1.25.2.3.1.3.1	(octet string)
hrStorageDescr.2	1.3.6.1.3.1.25.2.3.1.3.2	(octet string)
hrStorageDescr.3	1.3.6.1.3.1.25.2.3.1.3.3	(octet string)
hrStorageDescr.4	1.3.6.1.3.1.25.2.3.1.3.4	(octet string)
hrStorageAllocationUnits.1	1.3.6.1.3.1.25.2.3.1.4.1	(integer)
hrStorageAllocationUnits.2	1.3.6.1.3.1.25.2.3.1.4.2	(integer)
hrStorageAllocationUnits.3	1.3.6.1.3.1.25.2.3.1.4.3	(integer)
hrStorageAllocationUnits.4	1.3.6.1.3.1.25.2.3.1.4.4	(integer)
hrStorageSize.1	1.3.6.1.3.1.25.2.3.1.5.1	(integer)
hrStorageSize.2	1.3.6.1.3.1.25.2.3.1.5.2	(integer)
hrStorageSize.3	1.3.6.1.3.1.25.2.3.1.5.3	(integer)
hrStorageSize.4	1.3.6.1.3.1.25.2.3.1.5.4	(integer)
hrStorageUsed.1	1.3.6.1.3.1.25.2.3.1.6.1	(integer)
hrStorageUsed.2	1.3.6.1.3.1.25.2.3.1.6.2	(integer)
hrStorageUsed.3	1.3.6.1.3.1.25.2.3.1.6.3	(integer)
hrStorageUsed.4	1.3.6.1.3.1.25.2.3.1.6.4	(integer)
hrStorageAllocationFailures.1	1.3.6.1.3.1.25.2.3.1.7.1	(counter)
hrStorageAllocationFailures.2	1.3.6.1.3.1.25.2.3.1.7.2	(counter)
hrStorageAllocationFailures.3	1.3.6.1.3.1.25.2.3.1.7.3	(counter)
hrStorageAllocationFailures.4	1.3.6.1.3.1.25.2.3.1.7.4	(counter)
hrDeviceIndex.1	1.3.6.1.3.1.25.3.2.1.1.1	(integer)
hrDeviceIndex.2	1.3.6.1.3.1.25.3.2.1.1.2	(integer)
hrDeviceType.1	1.3.6.1.3.1.25.3.2.1.2.1	(object identifier)
hrDeviceType.2	1.3.6.1.3.1.25.3.2.1.2.2	(object identifier)
hrDeviceDescr.1	1.3.6.1.3.1.25.3.2.1.3.1	(octet string)

Table 17. HOST RESOURCES - RFC 1213 (continued)

OBJECT ID	MIB	TYPE
hrDeviceDescr.2	1.3.6.1.3.1.25.3.2.1.3.2	(octet string)
hrDeviceID.1	1.3.6.1.3.1.25.3.2.1.4.1	(object identifier)
hrDeviceID.2	1.3.6.1.3.1.25.3.2.1.4.2	(object identifier)
hrDeviceStatus.1	1.3.6.1.3.1.25.3.2.1.5.1	(integer)
hrDeviceStatus.2	1.3.6.1.3.1.25.3.2.1.5.2	(integer)
hrDeviceErrors.1	1.3.6.1.3.1.25.3.2.1.6.1	(counter)
hrDeviceErrors.2	1.3.6.1.3.1.25.3.2.1.6.2	(counter)
hrPrinterStatus.1	1.3.6.1.3.1.25.3.5.1.1.1	(integer)
hrPrinterDetectedErrorState.1	1.3.6.1.3.1.25.3.5.1.2.1	(octet string)

Table 18. PRINTER - RFC 1759

OBJECT ID	MIB	TYPE
prtGeneralConfigChanges.1	1.3.6.1.2.1.43.5.1.1.1.1	(counter)
prtGeneralCurrentLocalization.1	1.3.6.1.2.1.43.5.1.1.2.1	(integer)
prtGeneralReset.1	1.3.6.1.2.1.43.5.1.1.3.1	(integer)
prtGeneralCurrentOperator.1	1.3.6.1.2.1.43.5.1.1.4.1	(integer)
prtGeneralServicePerson.1	1.3.6.1.2.1.43.5.1.1.5.1	(integer)
prtInputDefaultIndex.1	1.3.6.1.2.1.43.5.1.1.6.1	(integer)
prtOutputDefaultIndex	1.3.6.1.2.1.43.5.1.1.7.1	(integer)
prtMarkerDefaultIndex.1	1.3.6.1.2.1.43.5.1.1.8.1	(integer)
prtMediaPathDefaultIndex.1	1.3.6.1.2.1.43.5.1.1.9.1	(integer)
prtConsoleLocalization.1	1.3.6.1.2.1.43.5.1.1.10.1	(integer)
prtConsoleNumberOfDisplayLines.1	1.3.6.1.2.1.43.5.1.1.11.1	(integer)
prtConsoleNumberOfDisplayChars.1	1.3.6.1.2.1.43.5.1.1.12.1	(integer)
prtCcnsoleDisable.1	1.3.6.1.2.1.43.5.1.1.13.1	(integer)
prtCoverDescription.1.1	1.3.6.1.2.1.43.6.1.1.2.1.1	(octet string)
prtCoverStatus.1.1	1.3.6.1.2.1.43.6.1.1.3.1.1	(integer)
prtLocalizationLanguage.1.1	1.3.6.1.2.1.43.7.1.1.2.1.1	(octet string)
prtLocalizationLanguage.1.2	1.3.6.1.2.1.43.7.1.1.2.1.2	(octet string)
prtLocalizationLanguage.1.3	1.3.6.1.2.1.43.7.1.1.2.1.3	(octet string)
prtLocalizationLanguage.1.4	1.3.6.1.2.1.43.7.1.1.2.1.4	(octet string)
prtLocalizationLanguage.1.5	1.3.6.1.2.1.43.7.1.1.2.1.5	(octet string)
prtLocalizationLanguage.1.6	1.3.6.1.2.1.43.7.1.1.2.1.6	(octet string)
prtLocalizationLanguage.1.7	1.3.6.1.2.1.43.7.1.1.2.1.7	(octet string)
prtLocalizationLanguage.1.8	1.3.6.1.2.1.43.7.1.1.2.1.8	(octet string)
prtLocalizationLanguage.1.9	1.3.6.1.2.1.43.7.1.1.2.1.9	(octet string)
prtLocalizationLanguage.1.10	1.3.6.1.2.1.43.7.1.1.2.1.10	(octet string)
prtLocalizationLanguage.1.11	1.3.6.1.2.1.43.7.1.1.2.1.11	(octet string)
prtLocalizationCountry.1.1	1.3.6.1.2.1.43.7.1.1.3.1.1	(octet string)
prtLocalizationCountry.1.2	1.3.6.1.2.1.43.7.1.1.3.1.2	(octet string)

Table 18. *PRINTER* - RFC 1759 (continued)

OBJECT ID	MIB	TYPE
prtLocalizationCountry.1.3	1.3.6.1.2.1.43.7.1.1.3.1.3	(octet string)
prtLocalizationCountry.1.4	1.3.6.1.2.1.43.7.1.1.3.1.4	(octet string)
prtLocalizationCountry.1.5	1.3.6.1.2.1.43.7.1.1.3.1.5	(octet string)
prtLocalizationCountry.1.6	1.3.6.1.2.1.43.7.1.1.3.1.6	(octet string)
prtLocalizationCountry.1.7	1.3.6.1.2.1.43.7.1.1.3.1.7	(octet string)
prtLocalizationCountry.1.8	1.3.6.1.2.1.43.7.1.1.3.1.8	(octet string)
prtLocalizationCountry.1.9	1.3.6.1.2.1.43.7.1.1.3.1.9	(octet string)
prtLocalizationCountry.1.10	1.3.6.1.2.1.43.7.1.1.3.1.10	(octet string)
prtLocalizationCountry.1.11	1.3.6.1.2.1.43.7.1.1.3.1.11	(octet string)
prtLocalizationCharacterSet.1.1	1.3.6.1.2.1.43.7.1.1.4.1.1	(integer)
prtLocalizationCharacterSet.1.2	1.3.6.1.2.1.43.7.1.1.4.1.2	(integer)
prtLocalizationCharacterSet.1.3	1.3.6.1.2.1.43.7.1.1.4.1.3	(integer)
prtLocalizationCharacterSet.1.4	1.3.6.1.2.1.43.7.1.1.4.1.4	(integer)
prtLocalizationCharacterSet.1.5	1.3.6.1.2.1.43.7.1.1.4.1.5	(integer)
prtLocalizationCharacterSet.1.6	1.3.6.1.2.1.43.7.1.1.4.1.6	(integer)
prtLocalizationCharacterSet.1.7	1.3.6.1.2.1.43.7.1.1.4.1.7	(integer)
prtLocalizationCharacterSet.1.8	1.3.6.1.2.1.43.7.1.1.4.1.8	(integer)
prtLocalizationCharacterSet.1.9	1.3.6.1.2.1.43.7.1.1.4.1.9	(integer)
prtLocalizationCharacterSet.1.10	1.3.6.1.2.1.43.7.1.1.4.1.10	(integer)
prtLocalizationCharacterSet.1.11	1.3.6.1.2.1.43.7.1.1.4.1.11	(integer)
prtInputType.1.1	1.3.6.1.2.1.43.8.2.1.2.1.1	(integer)
prtInputType.1.2	1.3.6.1.2.1.43.8.2.1.2.1.2	(integer)
prtInputDimUnit.1.1	1.3.6.1.2.1.43.8.2.1.3.1.1	(integer)
prtInputDimUnit.1.2	1.3.6.1.2.1.43.8.2.1.3.1.2	(integer)
prtInputMediaDimFeedDirDeclared.1.1	1.3.6.1.2.1.43.8.2.1.4.1.1	(integer)
prtInputMediaDimFeedDirDeclared.1.2	1.3.6.1.2.1.43.8.2.1.4.1.2	(integer)
prtInputMediaDimXFeedDirDeclared.1.1	1.3.6.1.2.1.43.8.2.1.5.1.1	(integer)
prtInputMediaDimXFeedDirDeclared.1.2	1.3.6.1.2.1.43.8.2.1.5.1.2	(integer)
prtInputMediaDimFeedDirChosen.1.1	1.3.6.1.2.1.43.8.2.1.6.1.1	(integer)
prtInputMediaDimFeedDirChosen.1.2	1.3.6.1.2.1.43.8.2.1.6.1.2	(integer)
prtInputMediaDimXFeedDirChosen.1.1	1.3.6.1.2.1.43.8.2.1.7.1.1	(integer)
prtInputMediaDimXFeedDirChosen.1.2	1.3.6.1.2.1.43.8.2.1.7.1.2	(integer)
prtInputCapacityUnit.1.1	1.3.6.1.2.1.43.8.2.1.8.1.1	(integer)
prtInputCapacityUnit.1.2	1.3.6.1.2.1.43.8.2.1.8.1.2	(integer)
prtInputMaxCapacity.1.1	1.3.6.1.2.1.43.8.2.1.9.1.1	(integer)
prtInputMaxCapacity.1.2	1.3.6.1.2.1.43.8.2.1.9.1.2	(integer)
prtInputCurrentLevel.1.1	1.3.6.1.2.1.43.8.2.1.10.1.1	(integer)
prtInputCurrentLevel.1.2	1.3.6.1.2.1.43.8.2.1.10.1.2	(integer)
prtInputStatus.1.1	1.3.6.1.2.1.43.8.2.1.11.1.1	(integer)
prtInputStatus.1.2	1.3.6.1.2.1.43.8.2.1.11.1.2	(integer)

Table 18. PRINTER - RFC 1759 (continued)

OBJECT ID	MIB	TYPE
prtInputMediaName.1.1	1.3.6.1.2.1.43.8.2.1.12.1.1	(octet string)
prtInputMediaName.1.2	1.3.6.1.2.1.43.8.2.1.12.1.2	(octet string)
prtInputName.1.1	1.3.6.1.2.1.43.8.2.1.13.1.1	(octet string)
prtInputName.1.2	1.3.6.1.2.1.43.8.2.1.13.1.2	(octet string)
prtInputVendorName.1.1	1.3.6.1.2.1.43.8.2.1.14.1.1	(octet string)
prtInputVendorName.1.2	1.3.6.1.2.1.43.8.2.1.14.1.2	(octet string)
prtInputModel.1.1	1.3.6.1.2.1.43.8.2.1.15.1.1	(octet string)
prtInputModel.1.2	1.3.6.1.2.1.43.8.2.1.15.1.2	(octet string)
prtInputVersion.1.1	1.3.6.1.2.1.43.8.2.1.16.1.1	(octet string)
prtInputVersion.1.2	1.3.6.1.2.1.43.8.2.1.16.1.2	(octet string)
prtInputSerialNumber.1.1	1.3.6.1.2.1.43.8.2.1.17.1.1	(octet string)
prtInputSerialNumber.1.2	1.3.6.1.2.1.43.8.2.1.17.1.2	(octet string)
prtInputDescription.1.1	1.3.6.1.2.1.43.8.2.1.18.1.1	(octet string)
prtInputDescription.1.2	1.3.6.1.2.1.43.8.2.1.18.1.2	(octet string)
prtInputMediaType.1.1	1.3.6.1.2.1.43.8.2.1.21.1.1	(octet string)
prtInputMediaType.1.2	1.3.6.1.2.1.43.8.2.1.21.1.2	(octet string)
prtOutputType.1.1	1.3.6.1.2.1.43.9.2.1.2.1.1.1	(integer)
prtOutputCapacityUnit.1.1	1.3.6.1.2.1.43.9.2.1.3.1.1.1	(integer)
prtOutputMaxCapacity.1.1	1.3.6.1.2.1.43.9.2.1.4.1.1.1	(integer)
prtOutputRemaining.Capacity.1.1	1.3.6.1.2.1.43.9.2.1.5.1.1.1	(integer)
prtOutputStatus.1.1	1.3.6.1.2.1.43.9.2.1.6.1.1.1	(integer)
prtMarkerMarkTech.1.1	1.3.6.1.2.1.43.10.2.1.2.1.1	(integer)
prtMarkerCounterUnit.1.1	1.3.6.1.2.1.43.10.2.1.3.1.1	(integer)
prtMarkerLifeCount.1.1	1.3.6.1.2.1.43.10.2.1.4.1.1	(counter)
prtMarkerPowerOnCount.1.1	1.3.6.1.2.1.43.10.2.1.5.1.1	(counter)
prtMarkerProcessColorants.1.1	1.3.6.1.2.1.43.10.2.1.6.1.1	(integer)
prtMarkerSpotColorants.1.1	1.3.6.1.2.1.43.10.2.1.7.1.1	(integer)
prtMarkerAddressabilityUnit.1.1	1.3.6.1.2.1.43.10.2.1.8.1.1	(integer)
prtMarkerAddressabilityFeedDir.1.1	1.3.6.1.2.1.43.10.2.1.9.1.1	(integer)
prtMarkerAddressabilityXFeedDir.1.1	1.3.6.1.2.1.43.10.2.1.10.1.1	(integer)
prtMarkerNorthMargin.1.1	1.3.6.1.2.1.43.10.2.1.11.1.1	(integer)
prtMarkerSouthMargin.1.1	1.3.6.1.2.1.43.10.2.1.12.1.1	(integer)
prtMarkerWestMargin.1.1	1.3.6.1.2.1.43.10.2.1.13.1.1	(integer)
prtMarkerEasatMargin.1.1	1.3.6.1.2.1.43.10.2.1.14.1.1	(integer)
prtMarkerStatus.1.1	1.3.6.1.2.1.43.10.2.1.15.1.1	(integer)
prtMediaPathMaxSpeedPrintUnit.1.1	1.3.6.1.2.1.43.13.4.1.2.1.1	(integer)
prtMediaPathMaxSpeedPrintUnit.1.2	1.3.6.1.2.1.43.13.4.1.2.1.2	(integer)
prtMediaPathMediaSizeUnit.1.1	1.3.6.1.2.1.43.13.4.1.3.1.1	(integer)
prtMediaPathPathMediaSizeUnit.1.2	1.3.6.1.2.1.43.13.4.1.3.1.2	(integer)
prtMediaPathMaxSpeed.1.1	1.3.6.1.2.1.43.13.4.1.4.1.1	(integer)

Table 18. PRINTER - RFC 1759 (continued)

OBJECT ID	MIB	TYPE
prtMediaPathMaxSpeed.1.2	1.3.6.1.2.1.43.13.4.1.4.1.2	(integer)
prtMediaPathMaxMediaFeedDir.1.1	1.3.6.1.2.1.43.13.4.1.5.1.1	(integer)
prtMediaPathMaxMediaFeedDir.1.2	1.3.6.1.2.1.43.13.4.1.5.1.2	(integer)
prtMediaPathMaxMediaXFeedDir.1.1	1.3.6.1.2.1.43.13.4.1.6.1.1	(integer)
prtMediaPathMaxMediaXFeedDir.1.2	1.3.6.1.2.1.43.13.4.1.6.1.2	(integer)
prtMediaPathMinMediaFeedDir.1.1	1.3.6.1.2.1.43.13.4.1.7.1.1	(integer)
prtMediaPathMinMediaFeedDir.1.2	1.3.6.1.2.1.43.13.4.1.7.1.2	(integer)
prtMediaPathMinMediaXFeedDir.1.1	1.3.6.1.2.1.43.13.4.1.8.1.1	(integer)
prtMediaPathMinMediaXFeedDir.1.2	1.3.6.1.2.1.43.13.4.1.8.1.2	(integer)
prtMediaPathType.1.1	1.3.6.1.2.1.43.13.4.1.9.1.1	(integer)
prtMediaPathType.1.2	1.3.6.1.2.1.43.13.4.1.9.1.2	(integer)
prtMediaPathDescription.1.1	1.3.6.1.2.1.43.13.4.1.10.1.1	(octet string)
prtMediaPathDescription.1.2	1.3.6.1.2.1.43.13.4.1.10.1.2	(octet string)
prtMediaPathStatus.1.1	1.3.6.1.2.1.43.13.4.1.11.1.1	(integer)
prtMediaPathStatus.1.2	1.3.6.1.2.1.43.13.4.1.11.1.2	(integer)
prtChannelType.1.1	1.3.6.1.2.1.43.14.1.1.2.1.1	(integer)
prtChannelType.1.2	1.3.6.1.2.1.43.14.1.1.2.1.2	(integer)
prtChannelType.1.3	1.3.6.1.2.1.43.14.1.1.2.1.3	(integer)
prtChannelType.1.4	1.3.6.1.2.1.43.14.1.1.2.1.4	(integer)
prtChannelType.1.5	1.3.6.1.2.1.43.14.1.1.2.1.5	(integer)
prtChannelState.1.1	1.3.6.1.2.1.43.14.1.1.6.1.1	(integer)
prtChannelState.1.2	1.3.6.1.2.1.43.14.1.1.6.1.2	(integer)
prtChannelState.1.3	1.3.6.1.2.1.43.14.1.1.6.1.3	(integer)
prtChannelState.1.4	1.3.6.1.2.1.43.14.1.1.6.1.4	(integer)
prtChannelState.1.4	1.3.6.1.2.1.43.14.1.1.6.1.5	(integer)
prtChannelIfIndex.1.1	1.3.6.1.2.1.43.14.1.1.7.1.1	(integer)
prtChannelIfIndex.1.2	1.3.6.1.2.1.43.14.1.1.7.1.2	(integer)
prtChannelIfIndex.1.3	1.3.6.1.2.1.43.14.1.1.7.1.3	(integer)
prtChannelIfIndex.1.4	1.3.6.1.2.1.43.14.1.1.7.1.4	(integer)
prtChannelIfIndex.1.5	1.3.6.1.2.1.43.14.1.1.7.1.5	(integer)
prtInterpreterLangFamily.1.1	1.3.6.1.2.1.43.15.1.1.2.1.1	(integer)
prtInterpreterLangFamily.1.2	1.3.6.1.2.1.43.15.1.1.2.1.2	(integer)
prtInterpreterLangFamily.1.3	1.3.6.1.2.1.43.15.1.1.2.1.3	(integer)
prtInterpreterLangFamily.1.4	1.3.6.1.2.1.43.15.1.1.2.1.4	(integer)
prtInterpreterLangLevel.1.1	1.3.6.1.2.1.43.15.1.1.3.1.1	(octet string)
prtInterpreterLangLevel.1.2	1.3.6.1.2.1.43.15.1.1.3.1.2	(octet string)
prtInterpreterLangLevel.1.3	1.3.6.1.2.1.43.15.1.1.3.1.3	(octet string)
prtInterpreterLangLevel.1.4	1.3.6.1.2.1.43.15.1.1.3.1.4	(octet string)
prtInterpreterLangVersion.1.1	1.3.6.1.2.1.43.15.1.1.4.1.1	(octet string)
prtInterpreterLangVersion.1.2	1.3.6.1.2.1.43.15.1.1.4.1.2	(octet string)

Table 18. PRINTER - RFC 1759 (continued)

OBJECT ID	MIB	TYPE
prtInterpreterLangVersion.1.3	1.3.6.1.2.1.43.15.1.1.4.1.3	(octet string)
prtInterpreterLangVersion.1.4	1.3.6.1.2.1.43.15.1.1.4.1.4	(octet string)
prtInterpreterLangVersion.1.1	1.3.6.1.2.1.43.15.1.1.5.1.1	(octet string)
prtInterpreterLangVersion.1.2	1.3.6.1.2.1.43.15.1.1.5.1.2	(octet string)
prtInterpreterLangVersion.1.3	1.3.6.1.2.1.43.15.1.1.5.1.3	(octet string)
prtInterpreterDescription.1.4	1.3.6.1.2.1.43.15.1.1.5.1.4	(octet string)
prtInterpreterVersion.1.1	1.3.6.1.2.1.43.15.1.1.6.1.1	(octet string)
prtInterpreterVersion.1.2	1.3.6.1.2.1.43.15.1.1.6.1.2	(octet string)
prtInterpreterVersion.1.3	1.3.6.1.2.1.43.15.1.1.6.1.3	(octet string)
prtInterpreterVersion.1.4	1.3.6.1.2.1.43.15.1.1.6.1.4	(octet string)
prtInterpreterDefaultOrientation.1.1	1.3.6.1.2.1.43.15.1.1.7.1.1	(integer)
prtInterpreterDefaultOrientation.1.2	1.3.6.1.2.1.43.15.1.1.7.1.2	(integer)
prtInterpreterDefaultOrientation.1.3	1.3.6.1.2.1.43.15.1.1.7.1.3	(integer)
prtInterpreterDefaultOrientation.1.4	1.3.6.1.2.1.43.15.1.1.7.1.4	(integer)
prtInterpreterFeedAddressability.1.1	1.3.6.1.2.1.43.15.1.1.8.1.1	(integer)
prtInterpreterFeedAddressability.1.2	1.3.6.1.2.1.43.15.1.1.8.1.2	(integer)
prtInterpreterFeedAddressability.1.3	1.3.6.1.2.1.43.15.1.1.8.1.3	(integer)
prtInterpreterFeedAddressability.1.4	1.3.6.1.2.1.43.15.1.1.8.1.4	(integer)
prtInterpreterXFeedAddressability.1.1	1.3.6.1.2.1.43.15.1.1.9.1.1	(integer)
prtInterpreterXFeedAddressability.1.2	1.3.6.1.2.1.43.15.1.1.9.1.2	(integer)
prtInterpreterXFeedAddressability.1.3	1.3.6.1.2.1.43.15.1.1.9.1.3	(integer)
prtInterpreterXFeedAddressability.1.4	1.3.6.1.2.1.43.15.1.1.9.1.4	(integer)
prtInterpreterDefaultCharSetIn.1.1	1.3.6.1.2.1.43.15.1.1.10.1.1	(integer)
prtInterpreterDefaultCharSetIn.1.2	1.3.6.1.2.1.43.15.1.1.10.1.2	(integer)
prtInterpreterDefaultCharSetIn.1.3	1.3.6.1.2.1.43.15.1.1.10.1.3	(integer)
prtInterpreterDefaultCharSetIn.1.4	1.3.6.1.2.1.43.15.1.1.10.1.4	(integer)
prtInterpreterDefaultCharSetOut.1.1	1.3.6.1.2.1.43.15.1.1.11.1.1	(integer)
prtInterpreterDefaultCharSetOut.1.2	1.3.6.1.2.1.43.15.1.1.11.1.2	(integer)
prtInterpreterDefaultCharSetOut.1.3	1.3.6.1.2.1.43.15.1.1.11.1.3	(integer)
prtInterpreterDefaultCharSetOut.1.4	1.3.6.1.2.1.43.15.1.1.11.1.4	(integer)
prtInterpreterTwoWay.1.1	1.3.6.1.2.1.43.15.1.1.12.1.1	(integer)
prtInterpreterTwoWay.1.2	1.3.6.1.2.1.43.15.1.1.12.1.2	(integer)
prtInterpreterTwoWay.1.3	1.3.6.1.2.1.43.15.1.1.12.1.3	(integer)
prtInterpreterTwoWay.1.4	1.3.6.1.2.1.43.15.1.1.12.1.4	(integer)
prtConsoleDisplayBufferText.1.1	1.3.6.1.2.1.43.16.5.1.2.1.1	(octet string)
prtConsoleDisplayBufferText.1.2	1.3.6.1.2.1.43.16.5.1.2.1.2	(octet string)
prtConsoleOnTime.1.1	1.3.6.1.2.1.43.17.6.1.2.1.1	(integer)
prtConsoleOnTime.1.2	1.3.6.1.2.1.43.17.6.1.2.1.2	(integer)
prtConsoleOnTime.1.3	1.3.6.1.2.1.43.17.6.1.2.1.3	(integer)
prtConsoleOnTime.1.4	1.3.6.1.2.1.43.17.6.1.2.1.4	(integer)

Table 18. *PRINTER* - RFC 1759 (continued)

OBJECT ID	MIB	TYPE
prtConsoleOnTime.1.5	1.3.6.1.2.1.43.17.6.1.2.1.5	(integer)
prtConsoleOnTime.1.6	1.3.6.1.2.1.43.17.6.1.2.1.6	(integer)
prtConsoleOffTime.1.1	1.3.6.1.2.1.43.17.6.1.3.1.1	(integer)
prtConsoleOffTime.1.2	1.3.6.1.2.1.43.17.6.1.3.1.2	(integer)
prtConsoleOffTime.1.3	1.3.6.1.2.1.43.17.6.1.3.1.3	(integer)
prtConsoleOffTime.1.4	1.3.6.1.2.1.43.17.6.1.3.1.4	(integer)
prtConsoleOffTime.1.5	1.3.6.1.2.1.43.17.6.1.3.1.5	(integer)
prtConsoleOffTime.1.6	1.3.6.1.2.1.43.17.6.1.3.1.6	(integer)
prtConsoleColor.1.1	1.3.6.1.2.1.43.17.6.1.4.1.1	(integer)
prtConsoleColor.1.2	1.3.6.1.2.1.43.17.6.1.4.1.2	(integer)
prtConsoleColor.1.3	1.3.6.1.2.1.43.17.6.1.4.1.3	(integer)
prtConsoleColor.1.4	1.3.6.1.2.1.43.17.6.1.4.1.4	(integer)
prtConsoleColor.1.5	1.3.6.1.2.1.43.17.6.1.4.1.5	(integer)
prtConsoleColor.1.6	1.3.6.1.2.1.43.17.6.1.4.1.6	(integer)
prtConsoleDescription.1.1	1.3.6.1.2.1.43.17.6.1.5.1.1	(octet string)
prtConsoleDescription.1.2	1.3.6.1.2.1.43.17.6.1.5.1.2	(octet string)
prtConsoleDescription.1.3	1.3.6.1.2.1.43.17.6.1.5.1.3	(octet string)
prtConsoleDescription.1.4	1.3.6.1.2.1.43.17.6.1.5.1.4	(octet string)
prtConsoleDescription.1.5	1.3.6.1.2.1.43.17.6.1.5.1.5	(octet string)
prtConsoleDescription.1.6	1.3.6.1.2.1.43.17.6.1.5.1.6	(octet string)
prtAlertSeverityLevel.1.1	1.3.6.1.2.1.43.18.1.1.2.1.1	(integer)
prtAlertTrainingLevel.1.1	1.3.6.1.2.1.43.18.1.1.3.1.1	(integer)
prtAlertGroup.1.1	1.3.6.1.2.1.43.18.1.1.4.1.1	(integer)
prtAlertGroupIndex.1.1	1.3.6.1.2.1.43.18.1.1.5.1.1	(integer)
prtAlertLocation.1.1	1.3.6.1.2.1.43.18.1.1.6.1.1	(integer)
prtAlertCOde.1.1	1.3.6.1.2.1.43.18.1.1.7.1.1	(integer)
prtAlertDescription.1.1	1.3.6.1.2.1.43.18.1.1.8.1.1	(octet string)
prtAlertTime	1.3.6.1.2.1.43.18.1.1.9.1.1	(timeticks)

prtAlertTable

prtAlertIndex.1.1
1.3.6.1.2.1.43.18.1.1.1.1.1 not accessible Interger32

prtAlertSeverityLevel.1.1
1.3.6.1.2.1.43.18.1.1.2.1.1 read only INTEGER

This MIB can assume the following values:

3 (critical)	in paper jam, ribbon jam, afta error, print error, or machine check condition.
4 (warning)	in paper out or cover open condition.
1 (other)	in all other conditions.

prtAlertTrainingLevel.1.1
1.3.6.1.2.1.43.18.1.1.3.1.1 read only INTEGER

prtAlertTable

This MIB can assume the following values:

3 (untrained)	in paper jam or cover open condition.
1 (other)	in all other conditions

prtAlertGroup.1.1 read only INTEGER

1.3.6.1.2.1.43.18.1.1.4.1.1

This MIB can assume the following values:

6 (cover)	in cover open condition.
9 (output)	in ribbon jam condition.
13 (mediapath)	in paper jam condition.
5 (generalPrinter)	in all other conditions.

prtAlertGroupIndex.1.1 read only Integer32

1.3.6.1.2.1.43.18.1.1.5.1.1

This MIB can assume the following values:

0 (generalPrinter index)
1 (marker index)
2 (cover index)
3 (mediaPath index)

prtAlertLocation.1.1 read only Integer32

1.3.6.1.2.1.43.18.1.1.6.1

This MIB always assumes the value of 1.

prtAlertCode.1.1 read only INTEGER

1.3.6.1.2.1.43.18.1.1.7.1.1

1 (other)	in ribbon jam condition.
3 (coverOpen)	in cover open condition.
8 (jam)	in paper jam condition.
503 (powerUp)	in all other conditions.

prtAlertDescription.1.1 read only OCTET STRING

1.3.6.1.2.1.43.18.1.1.8.1.1

This MIB can assume the following values:

"Ribbon Lock"	in ribbon jam condition.
"Cover Open"	in cover open condition.
"Jam"	in paper jam condition.
"PowerUp"	in all other conditions.

prtAlertTime.1.1 read only TimeTicks

1.3.6.1.2.1.43.18.1.1.9.1.1

This MIB always assumes the value of 0, that is:

0 days 00h:00m:00s:00th

Appendix H. The Remote Printer Management Utility

The Remote Printer Management Utility is a software tool for network administrators that allows the configuration and control of printers remotely connected to the Ethernet LAN.

With this tool the installed printers may be controlled, configured and organized easily.

The main features are:

Device Discovery	Searches for the devices within a range of IP addresses.
Printer Organization	The printers connected to the network can be organized into logical groups in a hierarchically structured tree.
Printer Status Report	Checks the printer's status and reports alarms.
Printer Configuration	The remotely connected printers may be configured as needed from the administrator's workstation.
Firmware Updating	Provides a firmware downloading function to upgrade both the base and the LAN card firmware.
Remote Operator Panel Management	Provides a virtual operator panel for the remotely connected printer at the administrator's workstation that allows to perform all functions normally achieved pressing the operator panel keys.

The Remote Printer Management Utility also provides the basic status management for third-party printers compliant to the standard MIB objects.

Operating System Compatibility

The Remote Printer Management Utility is a Java™ based application and can be run on any platform supporting the Java Run Time Environment version 1.6 or newer.

Software Installation and Documentation

The Remote Printer Management Utility software and User's Guide.

Notices

Thanks for choosing the 4247 printer.

Your printer is a reliable working equipment that will be very useful in your daily job.

Our printers have been designed to be compact and respectful of the work environment. They offer a wide range of features and multiple functions that confirm the high technological level reached by the printers with Compuprint brand.

To maintain these printing performances unchanged in the long run, Compuprint has developed specific consumables for each printer type that assure an excellent operation with high printing quality level reliability.

Compuprint srl recommends to use only its original consumables with original packaging (identified by its holographic label).

In this way, a proper use of the printer at quality level stated in the product characteristics can be assured.

All typical usage problems related to not certified consumables may be avoided, such as an overall quality print level degradation and, often, the reduction of the product life due to the fact that the proper working conditions for the print heads and other printer parts are not assured.

Moreover, Compuprint does not only certify its consumables in terms of working conditions but also carefully controls their compliance with the international standard rules concerning:

- no cancerous materials;
- no flammability of the plastic materials;
- other standards

Compuprint advises the customers not to use products for which the compliance to this safety rules are not warranted. Finally seek your dealer or contact a Compuprint office and be sure that are provided you the original consumables.

FFC Notes

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Compuprint is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment. This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

European Union (EU) Conformity Statement

Compuprint srl declares that this product is in compliance with the essential requirements and other relevant provisions of Directive 2006/95/EC, 2004/108/EC.

Per the applicable requirements of EU directive 98/37/EC ("machines") sound pressure of the above product (measured according to EN27779) does not exceed 70dBA.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to European standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication devices. Important This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Properly shielded and grounded cables and connectors must be used in order to reduce the potential for causing

interference to radio and TV communications and to other electrical or electronic equipment.

Compuprint srl cannot accept responsibility for any interference caused by using other than recommended cables and connectors.

Industry Canada Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conform à la norme NMB-003 du Canada.

Statement for CISPR 22 Edition 2 Compliance

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

User Information according to European Directive 2002/95/EC and 2003/108/EC

This unit must be recycled or discarded according to applicable local and national regulations.



The symbol shown on the left, applied to the product or on its packing, indicates that, at end of life, the product is not to be thrown away, or disposed as unsorted municipal waste, but separately collected.

Compuprint srl encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed.

Customer that needs to dispose this equipment must contact the produce and follow the collection framework available locally for the return, recycling and recovery of WEEE.

Customer participation to the separate collection is important to minimize any potential effects on the environment and human health, due to the potential presence of hazardous substances in the equipment, and aids the reuse and recycle of the materials by which the equipment is made.

Uncorrect disposal of the product by the customer will be punished according to the local regulations and Laws.



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